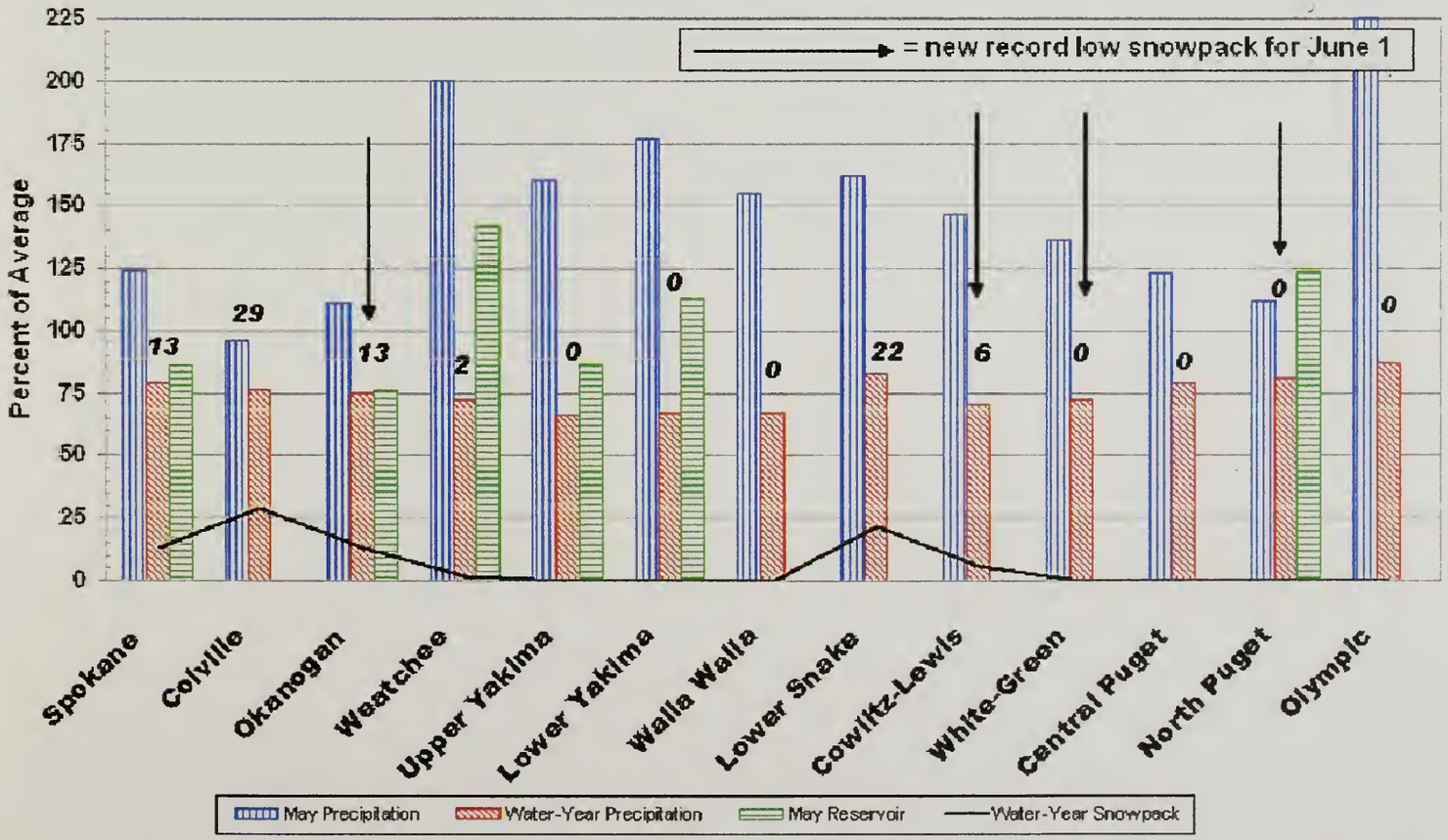
United States Department of Agriculture

Resources
Conservation
Service

Washington
Water Supply Outlook Report
June 1, 2005

NRCS Natural Resources Conservation Service

June 1, 2005 -
Snowpack, Precipitation and Reservoir Conditions at a Glance
(Water Year = October 1, 2004 - Current Date)



Water Supply Outlook Reports
and
Federal - State – Private Cooperative Snow Surveys

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How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

Washington
Water Supply Outlook

June 2005

General Outlook

What a year to remember, certainly one for the record books. Records set over 30 years ago and thought to be unbreakable fell by the way side during this unprecedented year of low snowpack, precipitation and runoff. Current conditions don't appear to be so grim with nearly full reservoirs, seasonally normal or above normal rainfall and forecasts for continued normal to above normal climatic conditions. However, as summer progresses we will begin to see the effects of record low snowpack leading to record low streamflows and lowering reservoir levels. All but two basins set record low snowpack levels at sometime or another this season while summer streamflows are predicted to set new record lows on 16 eastside and 3 westside streams, including the Okanogan, Wenatchee, Yakima, Olympic Peninsula and North Puget Sound areas. Though municipal and hydroelectric uses appear to be ok, recreation, irrigation and fisheries will most likely endure the worst suffrages this season. This will be the last published report for this season. Up to date mountain weather data is available year round at the various NRCS Snow Survey and Water Supply web sites.

Snowpack

The June 1 statewide SNOTEL readings fell dramatically from last month to only 4% of average. Many basins are now snow free which is 1-2 months earlier than normal. Currently and historically very few manual readings are available for June 1 making it very difficult to compare current and past data. At this time of year SNOTEL is about our only hope, however SNOTEL wasn't available in 1977 so making June 1 comparisons is sketchy at best. Maximum snow cover in Washington was at Paradise Park SNOTEL near Mt. Rainer, with water content of 5.5 inches. This site would normally have 61.6 inches of water content on June 1 and normally would not completely melt out until sometime in August. Remaining snowpack in most of the basins listed below is located at sites that are actually in neighboring states or Canada.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane	32	13
Pend Oreille	57	29
Okanogan	0	13
Methow	0	0
Conconully Lake	0	0
Wenatchee	31	6
Chelan	11	3
Upper Yakima	0	0
Lower Yakima	0	0
Ahtanum Creek	0	0
Walla Walla	0	0
Lower Snake	30	22
Cowlitz	8	6
Lewis	0	0
White	0	0
Green	0	0
Cedar	0	0
Snoqualmie	0	0
Skykomish	0	0
Skagit	0	0
Baker	N/A	N/A
Nooksack	0	0
Olympic Peninsula	0	0

Precipitation

During the month of May, the National Weather Service and Natural Resources Conservation Service climate stations reported precipitation totals ranging from 96% to 225% of average in Washington river basins. The highest percent of average in the state was at Leavenworth, WA which reported 455% of average for a total of 3.87 inches. The average for this site is .85 inches for May. Bunchgrass Meadows SNOTEL reported the least at only 81% of normal. The wettest spot in the state was reported at Sheep Canyon SNOTEL in the Lewis River Basin with a May accumulation of 13.4 inches. Basin averages for the water year remain below average with the Olympic Peninsula reporting the highest at 87% and the Upper Yakima River Basin with the lowest at 66% of average.

RIVER BASIN	MAY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	124	79
Colville-Pend Oreille	96	76
Okanogan-Methow	111	75
Wenatchee-Chelan	200	72
Upper Yakima	160	66
Lower Yakima	177	67
Walla Walla	155	67
Lower Snake	162	83
Cowlitz-Lewis	146	70
White-Green-Puyallup	136	72
Central Puget Sound	123	79
North Puget Sound	112	81
Olympic Peninsula	225	87

Reservoir

Seasonal reservoir levels in Washington vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation and flood control. Reservoir storage in the Yakima Basin was 632,000-acre feet, 87% of average for the Upper Reaches and 231,000-acre feet, 113% of average for Rimrock and Bumping Lakes. Storage at the Okanogan reservoirs was 76% of average for June 1. The power generation reservoirs included the following: Coeur d'Alene Lake, 234,000 acre feet, 86% of average and 98% of capacity; Chelan Lake, 672,000-acre feet, 142% of average and 99% of capacity; and the Skagit River reservoirs at 124% of average and 93% of capacity.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	98	86
Colville-Pend Oreille	N/A	N/A
Okanogan-Methow	68	76
Wenatchee-Chelan	99	142
Upper Yakima	76	87
Lower Yakima	100	113
North Puget Sound	93	124

For more information contact your local Natural Resources Conservation Service office.

Streamflow

Most forecasts for summer streamflows are slightly higher than last months predictions however there are still many low flow records forecasted to be set. June forecasts vary from 78% of average for the Columbia River at Birchbank to 23% of average for Kachess Lake inflow in the Upper Yakima basin. June-September forecasts for some Western Washington streams include the Cedar River near Cedar Falls, 56%; Green River, 58%; and Skagit River, 52%. Some Eastern Washington streams include the Yakima River near Parker, 25%: Wenatchee River at Plain, 35%; and Spokane River near Post Falls, 49%. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS.

Statewide May streamflows were mostly below average due to early snowmelt runoff which mostly occurred last month along with reservoir management practices that are holding water for later use. The Kettle River near Laurier had the highest reported flows with 100% of average. The Yakima River at Kiona with 39% of average was the lowest in the state. Other streamflows were the following percentage of average: the Cowlitz at Castle Rock, 85%; the Spokane at Spokane, 49%; the Columbia below Rock Island Dam, 83%; and the Cle Elum near Roslyn, 49%.

BASIN	PERCENT OF AVERAGE (50 PERCENT CHANCE OF EXCEEDENCE)
Spokane	49-77
Colville-Pend Oreille	44-78
Okanogan-Methow	24-59
Wenatchee-Chelan	44-77
Upper Yakima	23-33
Lower Yakima	25-46
Walla Walla	41-73
Lower Snake	54-65
Cowlitz-Lewis	46-77
White-Green-Puyallup	58-69
Central Puget Sound	53-59
North Puget Sound	52-70
Olympic Peninsula	49-60

STREAM	PERCENT OF AVERAGE MAY STREAMFLOWS
Pend Oreille Below Box Canyon	71
Kettle at Laurier	100
Columbia at Birchbank	97
Spokane at Long Lake	51
Similkameen at Nighthawk	52
Okanogan at Tonasket	52
Methow at Pateros	61
Chelan at Chelan	78
Wenatchee at Pashastin	62
Yakima at Cle Elum	44
Yakima at Parker	42
Naches at Naches	51
Grande Ronde at Troy	92
Snake below Lower Granite Dam	77
SF Walla Walla near Milton Freewater	65
Columbia River at The Dalles	81
Lewis at Ariel	82
Cowlitz below Mayfield Dam	79
Skagit at Concrete	66

For more information contact your local Natural Resources Conservation Service office.

BASIN SUMMARY OF SNOW COURSE DATA

JUNE 2005

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00
ALPINE MEADOWS SNTL	3500	6/01/05	0	.0	15.0	31.4
BADGER PASS SNOTEL	6900	6/01/05	12	5.6	19.2	22.9
BARKER LAKES SNOTEL	8250	6/01/05	36	12.1	8.2	9.5
BASIN CREEK SNOTEL	7180	6/01/05	0	.0	.3	4.1
BEAVER PASS SNOTEL	3680	6/01/05	0	.0	3.8	--
BIG WHITE MTN CAN.	5510	5/31/05	0	.0	--	8.0
BLACK PINE SNOTEL	7100	6/01/05	0	.0	.0	1.9
BLACKWALL PEAK CAN.	6370	6/01/05	---	.0E	10.6	--
BLEWETT PASS#2SNOTEL	4270	6/01/05	0	.0	.0	.0
BRENDA MINE CAN.	4450	6/01/05	---	.0E	--	2.7
BUMPING RIDGE SNOTEL	4600	6/01/05	0	.0	.0	11.6
BUNCHGRASS MDWSNOTEL	5000	6/01/05	0	.0	.0	9.7
BURNT MOUNTAIN PIL	4200	6/01/05	0	.0	.0	--
CAYUSE PASS	5300	6/01/05	---	5.6	--	--
COMBINATION SNOTEL	5600	6/01/05	0	.0	.0	.0
COPPER BOTTOM SNOTEL	5200	6/01/05	0	.0	.0	.0
CORRAL PASS SNOTEL	6000	6/01/05	0	.0	20.3	23.1
COUGAR MTN. SNOTEL	3200	6/01/05	0	.0	.0	1.5
DALY CREEK SNOTEL	5780	6/01/05	0	.0	.0	.0
DISCOVERY BASIN	7050	5/31/05	0	.0	.2	2.4
DOCK BUTTE AM	3800	6/01/05	---	.0E	21.0	--
DUNGENESS SNOTEL	4100	6/01/05	0	.0	.0	--
EASY PASS AM	5200	6/01/05	---	.0E	55.0	--
ELBOW LAKE SNOTEL	3200	6/01/05	0	.0	.0	19.8
EMERY CREEK SNOTEL	4350	6/01/05	0	.0	.0	.0
ENDERBY CAN.	5800	6/04/05	34	18.1	25.2	37.8
FISH LAKE SNOTEL	3370	6/01/05	0	.0	.0	7.5
FLATTOP MTN SNOTEL	6300	6/01/05	31	14.4	25.2	36.5
FROHNER MDWS SNOTEL	6480	6/01/05	0	.0	.0	.7
GRAVE CRK SNOTEL	4300	6/01/05	0	.0	.0	.0
GREEN LAKE SNOTEL	6000	6/01/05	0	.0	.0	6.6
GROUSE CAMP SNOTEL	5380	6/01/05	0	.0	.0	.2
HAND CREEK SNOTEL	5030	6/01/05	0	.0	.0	.0
HARTS PASS SNOTEL	6500	6/01/05	0	.0	7.2	29.2
HELL ROARING DIVIDE	5770	5/30/05	4	2.0	13.9	10.8
HIGH RIDGE SNOTEL	4980	6/01/05	0	.0	.0	1.2
HOODOO BASIN SNOTEL	6050	6/01/05	31	14.3	20.9	28.4
HUCKLEBERRY SNOTEL	2000	6/01/05	0	.0	.0	--
HUMBOLDT GLCH SNOTEL	4250	6/01/05	0	.0	.0	.0
JUNE LAKE SNOTEL	3200	6/01/05	0	.0	.0	10.1
KRAFT CREEK SNOTEL	4750	6/01/05	0	.0	.0	.0
LOLO PASS SNOTEL	5240	6/01/05	0	.0	.0	4.9
LONE PINE SNOTEL	3800	6/01/05	0	.0	16.8	18.4
LOOKOUT SNOTEL	5140	6/01/05	0	.0	.0	8.0
LOST HORSE SNOTEL	5000	6/01/05	0	.0	.0	.2
LOST LAKE SNOTEL	6110	6/01/05	---	9.3	25.5	41.5
LUBRECHT SNOTEL	4680	6/01/05	0	.0	.0	.0
LYMAN LAKE SNOTEL	5900	6/01/05	---	3.8	12.1	50.8
MEADOWS PASS SNOTEL	3240	6/01/05	0	.0	.0	.9
M F NOOKSACK SNOTEL	4980	6/01/05	0	.0	49.9	--
MICA CREEK SNOTEL	4750	6/01/05	0	.0	.0	.0
MINERS RIDGE SNOTEL	6200	6/01/05	0	.0	19.0	42.5
MISSION CREEK CAN.	5840	6/01/05	---	2.5E	11.5	13.0
MORRISSEY RIDGE CAN.	6100	6/01/05	---	.0E	--	--
MORSE LAKE SNOTEL	5400	6/01/05	0	.0	15.0	33.6
MOSES MTN SNOTEL	4800	6/01/05	0	.0	.0	.1
MOSQUITO RDG SNOTEL	5200	6/01/05	0	.0	3.2	11.0
MOUNT BLUM AM	5800	6/01/05	---	.0E	31.0	--
MOUNT CRAG SNOTEL	4050	6/01/05	0	.0	1.5	7.8
MT. KOBAU CAN.	5500	5/30/05	0	.0	--	5.2
MOWICH SNOTEL	3150	6/01/05	0	.0	.0	--
MOUNT GARDNER SNOTEL	2860	6/01/05	0	.0	.0	.0
N.F. ELK CR SNOTEL	6250	6/01/05	0	.0	.0	.6
NEVADA RIDGE SNOTEL	7020	6/01/05	0	.0	.0	3.4
NEZ PERCE CMP SNOTEL	5650	6/01/05	0	.0	.0	.3
NOISY BASIN SNOTEL	6040	6/01/05	17	8.8	22.7	30.1
NORTH FORK JOCKO	6330	5/27/05	31	15.1	8.6	--
OLALLIE MDWS SNOTEL	3960	6/01/05	0	.0	11.7	31.8
PARADISE PARK SNOTEL	5500	6/01/05	---	5.5	55.2	61.6
PARK CK RIDGE SNOTEL	4600	6/01/05	0	.0	.0	11.5
PETERSON MDW SNOTEL	7200	6/01/05	0	.0	.0	2.7
PIGTAIL PEAK SNOTEL	5900	6/01/05	---	1.8	31.9	39.9
PIKE CREEK SNOTEL	5930	6/01/05	0	.0	.0	7.3
POPE RIDGE SNOTEL	3540	6/01/05	0	.0	.0	.0
POTATO HILL SNOTEL	4500	6/01/05	0	.0	.0	2.7
QUARTZ PEAK SNOTEL	4700	6/01/05	0	.0	.0	.0
RAINY PASS SNOTEL	4780	6/01/05	0	.0	5.0	24.3
REX RIVER SNOTEL	1900	6/01/05	0	.0	.0	6.1
ROCKER PEAK SNOTEL	8000	6/01/05	21	7.8	11.3	11.7
SADDLE MTN SNOTEL	7900	6/01/05	11	2.8	10.1	16.3
SALMON MDWS SNOTEL	4500	6/01/05	0	.0	.0	.0
SASSE RIDGE SNOTEL	4200	6/01/05	0	.0	.0	5.9
SAVAGE PASS SNOTEL	6170	6/01/05	0	.0	.3	10.4
SCHREIBERS MDW AM	3400	6/01/05	---	.0E	20.0	--
SENTINEL BT SNOTEL	4920	6/01/05	0	.0	.0	--
SHEEP CANYON SNOTEL	4050	6/01/05	0	.0	6.1	13.7
SHERWIN SNOTEL	3200	6/01/05	0	.0	.0	.0
SILVER STAR MTN CAN.	5600	5/30/05	15	8.4	--	18.4
SKALKAHO SNOTEL	7260	6/01/05	0	.0	10.0	14.6
SKOOKUM CREEK SNOTEL	3920	6/01/05	0	.0	.0	1.5
SOURDOUGH GULCH SNTL	4000	6/01/05	0	.0	.0	--
SPENCER MDW SNOTEL	3400	6/01/05	0	.0	.0	3.0
SPIRIT LAKE SNOTEL	3100	6/01/05	0	.0	.0	--
SPRUCE SPRINGS SNTL	5700	6/01/05	0	.0	.0	--
STAHL PEAK SNOTEL	6030	6/01/05	35	19.2	19.3	28.0
STAMPEDE PASS SNOTEL	3860	6/01/05	0	.0	6.0	18.6
STEVENS PASS SNOTEL	4070	6/01/05	0	.0	.0	9.0
SUNSET SNOTEL	5540	6/01/05	0	.0	.0	13.5
SWAMP CREEK SNOTEL	4000	6/01/05	0	.0	.0	--
THUNDER BASIN SNOTEL	4200	6/01/05	0	.0	.0	9.3
TINKHAM CREEK SNOTEL	3000	6/01/05	0	.0	.0	2.9
TOUCHET SNOTEL	5530	6/01/05	0	.0	.0	2.5
TROUGH #2 SNOTEL	5310	6/01/05	0	.0	.0	.0
TV MOUNTAIN	6800	5/27/05	3	1.4	.0	--
TWELVEMILE SNOTEL	5600	6/01/05	0	.0	.0	.4
TWIN LAKES SNOTEL	6400	6/01/05	0	.0	7.3	22.3
UPPER WHEELER SNOTEL	4400	6/01/05	0	.0	.0	.0
WARM SPRINGS SNOTEL	7800	6/01/05	25	9.1	17.2	17.0
WATSON LAKES AM	4500	6/01/05	---	.0E	33.0	--
WATERHOLE SNOTEL	5000	6/01/05	0	.0	10.1	--
WELLS CREEK SNOTEL	4200	6/01/05	0	.0	.0	--
WHITE PASS ES SNOTEL	4500	6/01/05	0	.0	.0	5.6
WHITE ROCKS MTN CAN.	7200	6/01/05	---	.0E	--	7.4

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Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
http://www.wa.nrcs.usda.gov/snow

Oregon:
http://www.or.nrcs.usda.gov/snow

Idaho:
http://www.id.nrcs.usda.gov/snow

National Water and Climate Center (NWCC):
http://www.wcc.nrcs.usda.gov

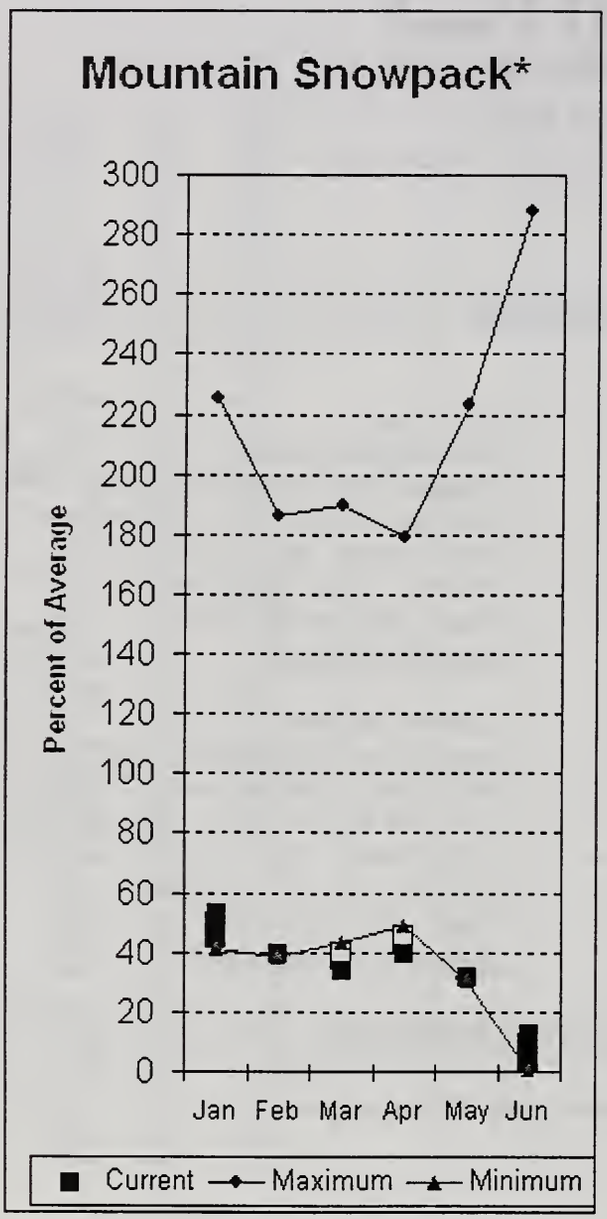
NWCC Anonymous FTP Server:
ftp.wcc.nrcs.usda.gov

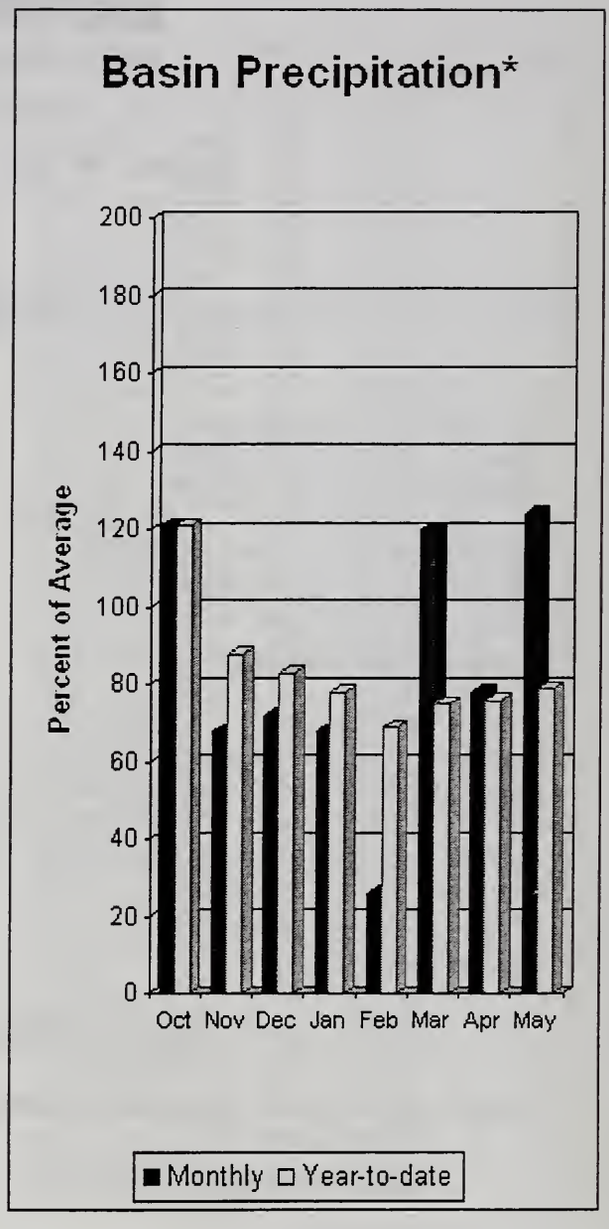
USDA-NRCS Agency Homepages

Washington:
http://www.wa.nrcs.usda.gov/nrcs

NRCS National:
http://www.nrcs.usda.gov

Spokane River Basin





*Based on selected stations

The June 1 forecasts for summer runoff within the Spokane River Basin are 49% of average near Post Falls and 59% at Long Lake. The Chamokane River near Long Lake forecasted to have 77% of average flows for the June-August period. The forecast is based on a basin snowpack that is 13% of average and precipitation that is 79% of average for the water year. Precipitation for May was at 124% of average. Streamflow on the Spokane River at Long Lake was 51% of average for May. June 1 storage in Coeur d'Alene Lake was 234,000-acre feet, 86% of average and 98% of capacity. Snowpack at Quartz Peak SNOTEL site melted out over a month early, the earliest since records began in 1988. Average temperatures in the Spokane basin were 3 degree above normal May and 3 degrees above for the water year.

For more information contact your local Natural Resources Conservation Service office.

SPOKANE RIVER BASIN
Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
SPOKANE near Post Falls (2)	JUN-SEP	276	338	380	49	465	595	775
	JUN-JUL	215	271	310	46	395	515	675
SPOKANE at Long Lake (2)	JUN-JUL	329	401	450	54	540	675	840
	JUN-SEP	482	564	620	59	715	860	1060
CHAMOKANE CREEK near Long Lake	JUL-AUG	2.3	2.5	2.7	77	2.8	3.1	3.5

SPOKANE RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
COEUR D'ALENE	238.5	233.5	228.5	270.4

SPOKANE RIVER BASIN
Watershed Snowpack Analysis - June 1, 2005

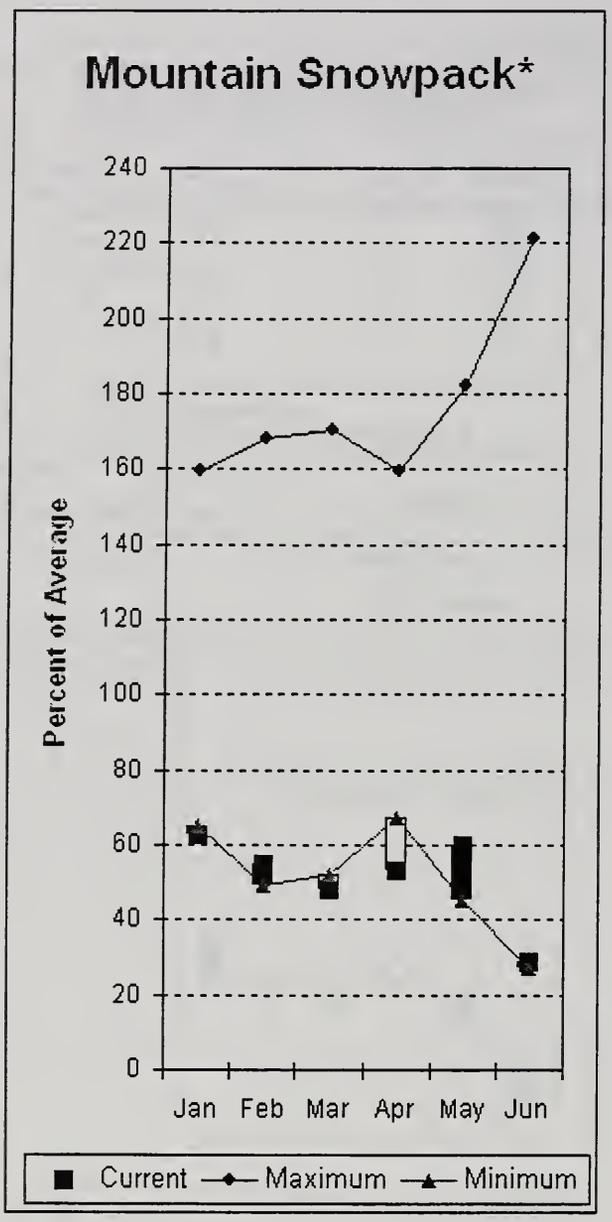
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
SPOKANE RIVER	8	32	13
NEWMAN LAKE	1	0	0

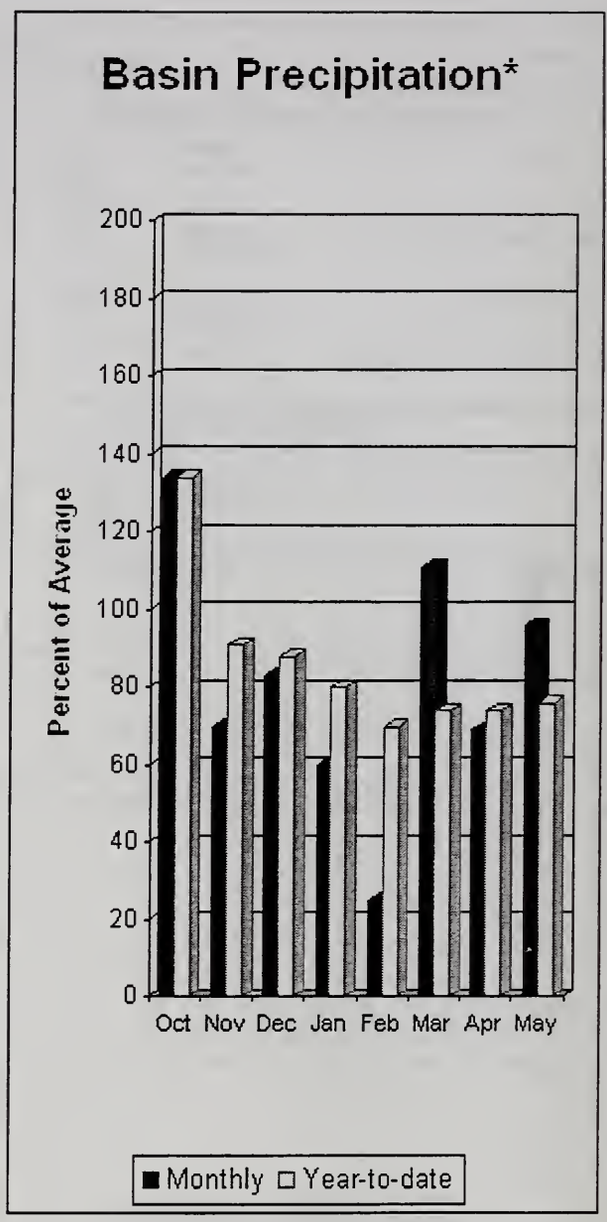
* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Colville - Pend Oreille River Basins





*Based on selected stations

The June – September average forecast for the Kettle River streamflow is 69%, Colville at Kettle Falls is 44%, and Priest River near the town of Priest River is 51%. May streamflow was 68% of average on the Pend Oreille River, 97% on the Columbia at the International Boundary and 100% on the Kettle River. June 1 snow cover was 29% of average in the Pend Oreille River Basin. No snowpack data was available for the Kettle River Basin. Bunchgrass Meadows SNOTEL site melted out on 5/21, about 1 month early. Normally Bunchgrass would still have 9.7 inches of water equivalent on June 1. Precipitation during May was 96% of average, bringing the year-to-date precipitation to 76% of average. Average temperatures were 3-4 degrees above normal for May and 3 degrees above for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<======= Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
PEND OREILLE Lake Inflow (2)	JUN-JUL	2120	2870	3380	55	3890	4640	6120
	JUN-SEP	2890	3720	4280	59	4840	5670	7280
PRIEST near Priest River (1,2)	JUN-JUL	111	128	139	48	163	215	290
	JUN-SEP	138	160	175	51	205	265	345
PEND OREILLE bl Box Canyon (2)	JUN-JUL	2525	3052	3410	55	4060	5020	6190
	JUN-SEP	3377	3933	4310	59	4960	5920	7370
COLVILLE at Kettle Falls	JUN-SEP	13.5	17.9	21	44	28	38	48
	JUN-JUL	8.8	12.3	14.7	42	20	29	35
KETTLE near Laurier	JUN-SEP	410	530	610	69	690	810	880
	JUN-JUL	380	475	540	69	605	705	780
COLUMBIA at Birchbank (1,2)	JUN-JUL	13579	15725	16700	76	17675	19820	22000
	JUN-SEP	19924	22658	23900	78	25140	27880	30600
COLUMBIA at Grand Coulee Dm (1,2)	JUN-SEP	25525	29359	31100	77	32840	36670	40300
	JUN-JUL	18025	21171	22600	75	24030	27180	30200

COLVILLE - PEND OREILLE RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
ROOSEVELT		NO REPORT		
BANKS		NO REPORT		

COLVILLE - PEND OREILLE RIVER BASINS
Watershed Snowpack Analysis - June 1, 2005

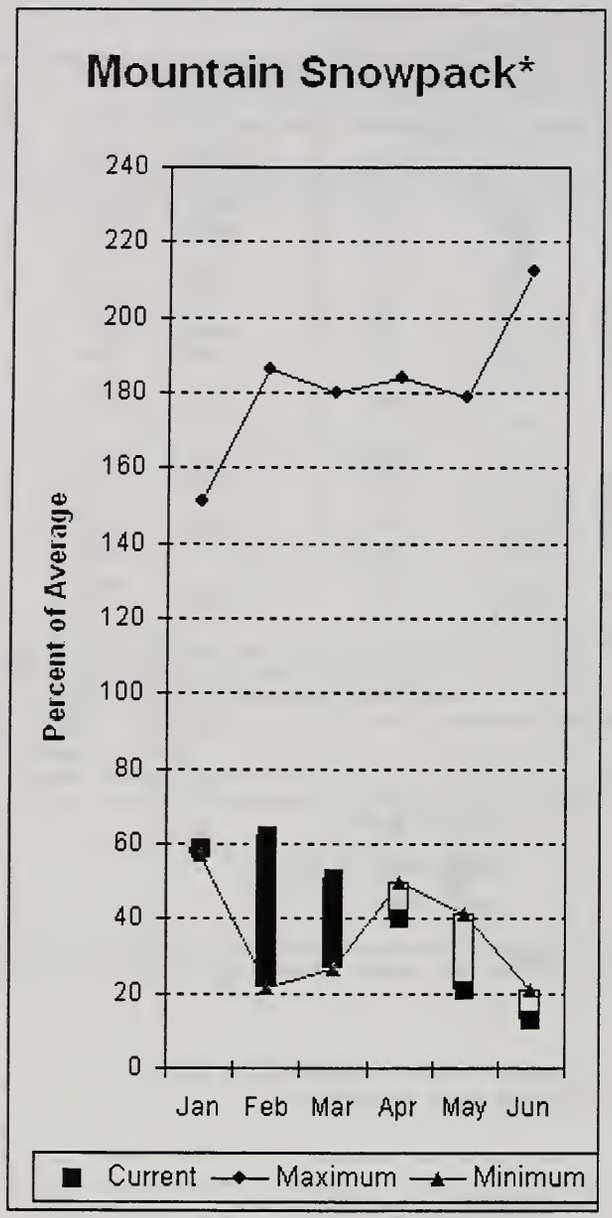
Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
COLVILLE RIVER	0	0	0
PEND OREILLE RIVER	8	0	0
KETTLE RIVER	1	0	0

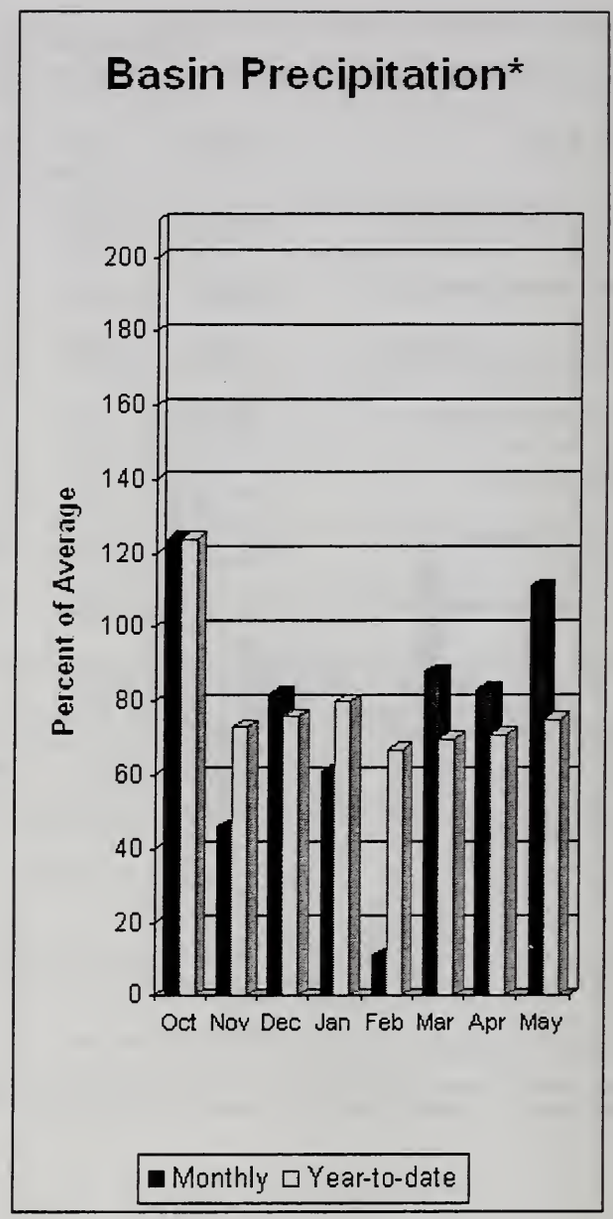
* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Okanogan - Methow River Basins





*Based on selected stations

Summer runoff average forecast for the Okanogan River at Malott is 24%, Methow River is 29% and Salmon Creek is 25%. The Similkameen River is forecasted at 25% of normal flows. June 1 snow cover on the Okanogan was 13% of average; Omak Creek and the Methow were melted out, setting a new low June 1 snowpack record. May precipitation in the Okanogan-Methow was 111% of average, with precipitation for the water year at 75% of average. May streamflow for the Methow River was 61% of average, 52% for the Okanogan River and 52% for the Similkameen. The only reported snow remaining is in the headwaters of the Okanogan. Combined storage in the Conconully Reservoirs was 16,000-acre feet, which is 68% of capacity and 76% of the June 1 average. Temperatures were 2-3 degrees above normal for May and 2 degrees above normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
SIMILKAMEEN near Nighthawk (1)	JUN-JUL	127	154	172	23	252	422	735
	JUN-SEP	161	190	210	25	290	465	835
OKANOGAN near Tonasket (1)	JUN-JUL	147	181	205	24	305	515	860
	JUN-SEP	190	232	260	25	375	615	1050
OKANOGAN at Malott (1)	JUN-JUL	193	200	205	23	225	275	894
	JUN-SEP	253	260	265	24	285	335	1085
Salmon Creek nr Conconully	JUN-JUL	0.0	0.8	2.0	23	3.6	6.9	8.9
	JUN-SEP	0.1	1.1	2.5	25	4.5	8.4	9.9
TOATS COULEE CREEK nr Loomis	JUN-JUL	3.8	6.5	8.4	55	11.8	16.8	15.3
	JUN-SEP	5.3	8.1	10.0	59	13.2	17.9	16.9
Beaver Creek blw SF nr Twisp	JUN-SEP	1.3	1.9	2.4	38	3.6	5.4	6.3
	JUN-JUL	0.8	1.4	1.8	34	3.0	4.7	5.3
METHOW RIVER near Pateros	JUN-SEP	125	146	160	29	210	280	560
	JUN-JUL	100	115	126	26	167	228	490

OKANOGAN - METHOW RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
SALMON LAKE	10.5	7.8	---	9.7
CONCONULLY RESERVOIR	13.0	8.2	.---	11.4

OKANOGAN - METHOW RIVER BASINS
Watershed Snowpack Analysis - June 1, 2005

Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
OKANOGAN RIVER	2	0	0
OMAK CREEK	1	0	0
SANPOIL RIVER	0	0	0
SIMILKAMEEN RIVER	0	0	0
TOATS COULEE CREEK	0	0	0
CONCONULLY LAKE	1	0	0
METHOW RIVER	3	0	0

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
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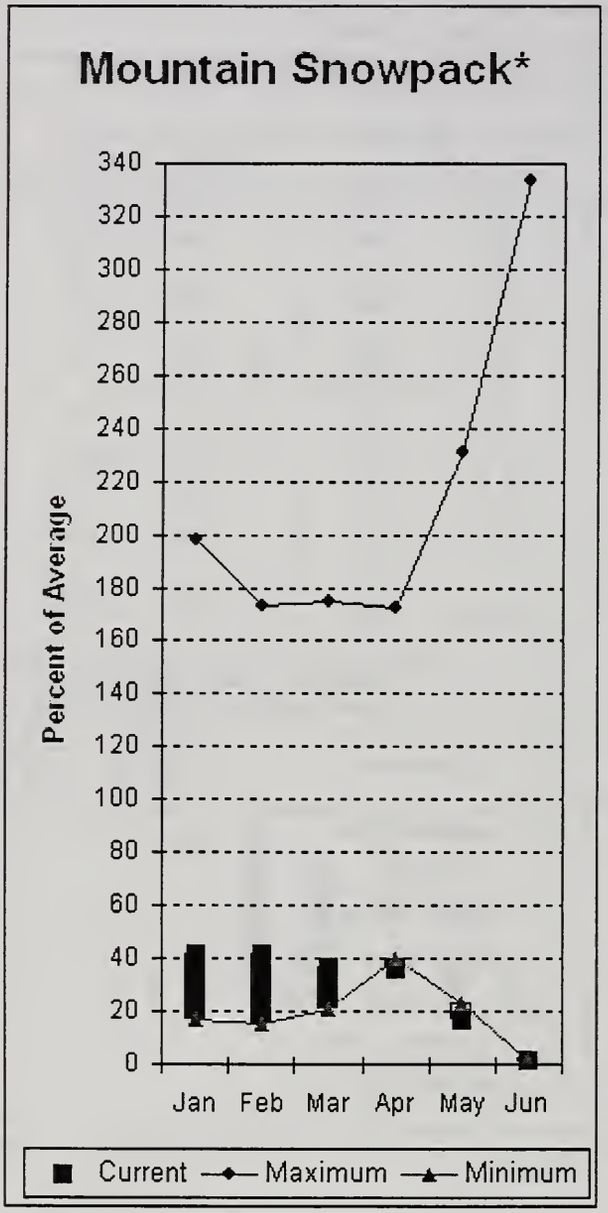
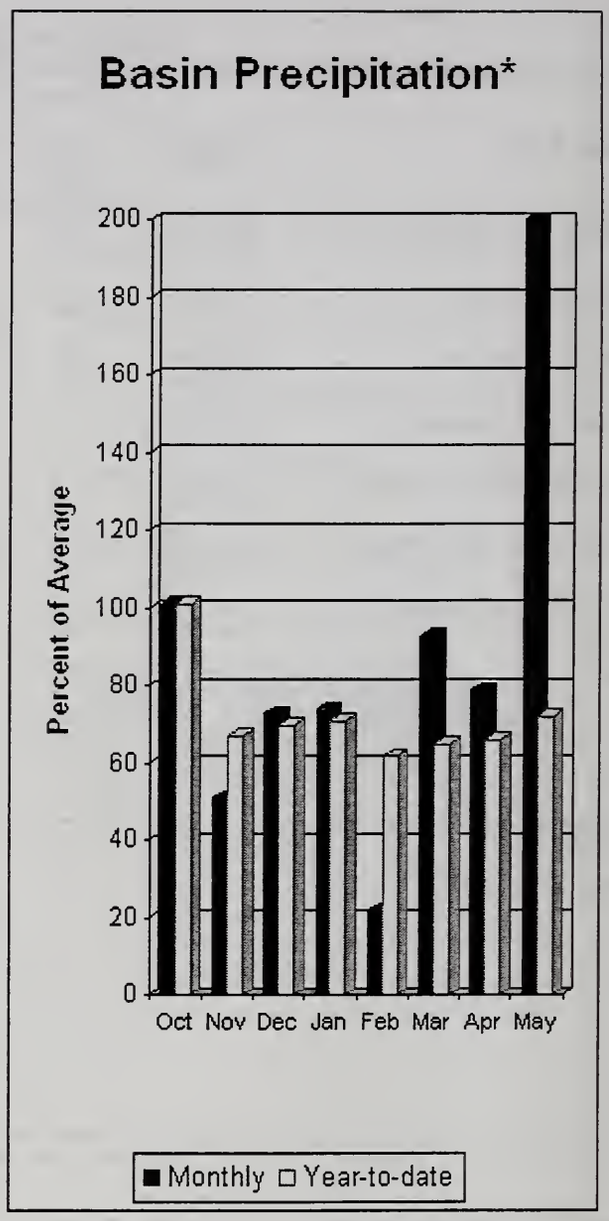
Wenatchee - Chelan River Basins





*Based on selected stations

Precipitation during May was 200% of average in the basin and 72% for the year-to-date. Runoff for Entiat River is forecast to be 32% of average for the summer. The June-September average forecast for Chelan River is 38%, Wenatchee River at Plain is 35%, Stehekin River is 41% and Icicle Creek natural flow is 51%. Stehekin, Chelan, Entiat and Wenatchee rivers are all expected to hit record low flows this summer. Stemilt and Squilchuck creeks are all forecasted to have below average flows this year as well. May average streamflows on the Chelan River were 78% and on the Wenatchee River 62%. June 1 snowpack in the Wenatchee-Chelan river basins had melted at all sites except Lyman Lake which stood at only 7%. Reservoir storage in Lake Chelan was 672,000-acre feet, 142% of June 1 average and 99% of capacity. Temperatures were 2-3 degrees above normal for May and 2 degrees above normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
CHELAN RIVER near Chelan	JUN-SEP	219	255	280	38	345	440	730
	JUN-JUL	173	204	225	38	280	365	590
STEHEKIN near STEHEKIN	JUN-SEP	175	202	220	41	265	330	535
	JUN-JUL	123	143	157	38	193	245	410
ENTIAT RIVER nr Ardenvoir	JUN-SEP	42	45	47	32	53	63	149
	JUN-JUL	35	37	39	31	44	52	127
WENATCHEE at Plain	JUN-JUL	161	184	200	35	245	310	575
	JUN-SEP	192	220	240	35	295	380	695
STEMILT CK nr Wenatchee (miner's in)	MAY-SEP	34	41	45	33	58	78	138
ICICLE CREEK near Leavenworth	JUN-SEP	81	93	101	51	117	141	199
	JUN-JUL	67	78	85	49	100	123	172
COLUMBIA R. bl Rock Island Dam (2)	JUN-SEP	27864	31220	33500	77	35780	39140	43500
	JUN-JUL	18964	22320	24600	75	26880	30240	33000

WENATCHEE - CHELAN RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
CHELAN LAKE	676.1	672.2	---	473.0

WENATCHEE - CHELAN RIVER BASINS
Watershed Snowpack Analysis - June 1, 2005

Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
CHELAN LAKE BASIN	4	11	3
ENTIAT RIVER	1	0	0
WENATCHEE RIVER	6	31	6
STEMILT CREEK	1	0	0
COLOCKUM CREEK	1	0	0

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

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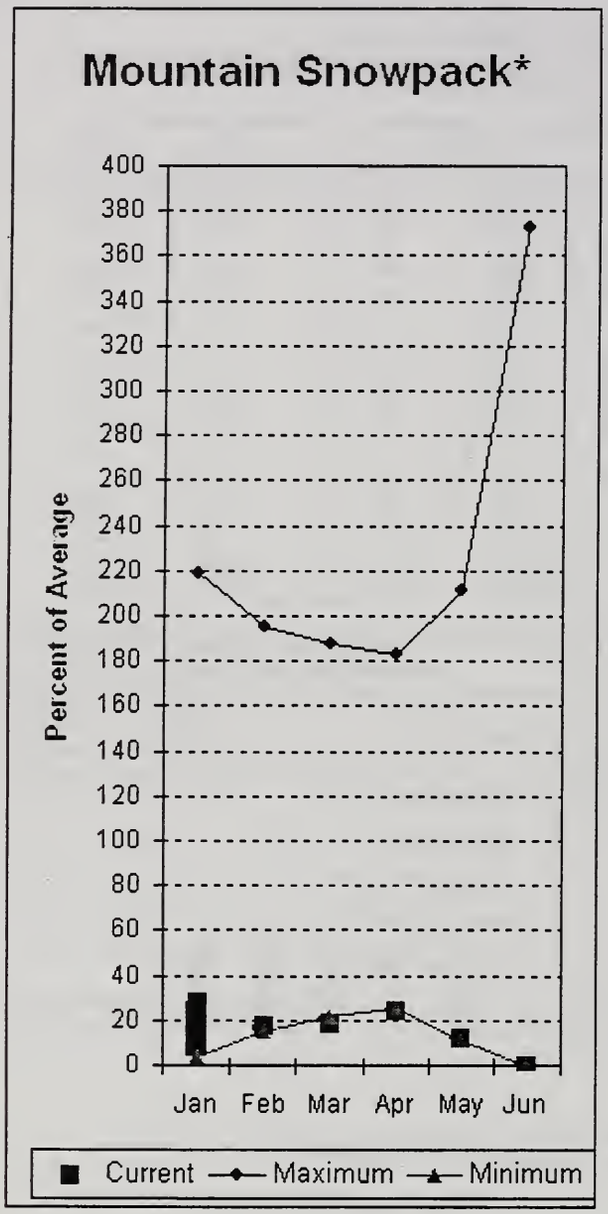
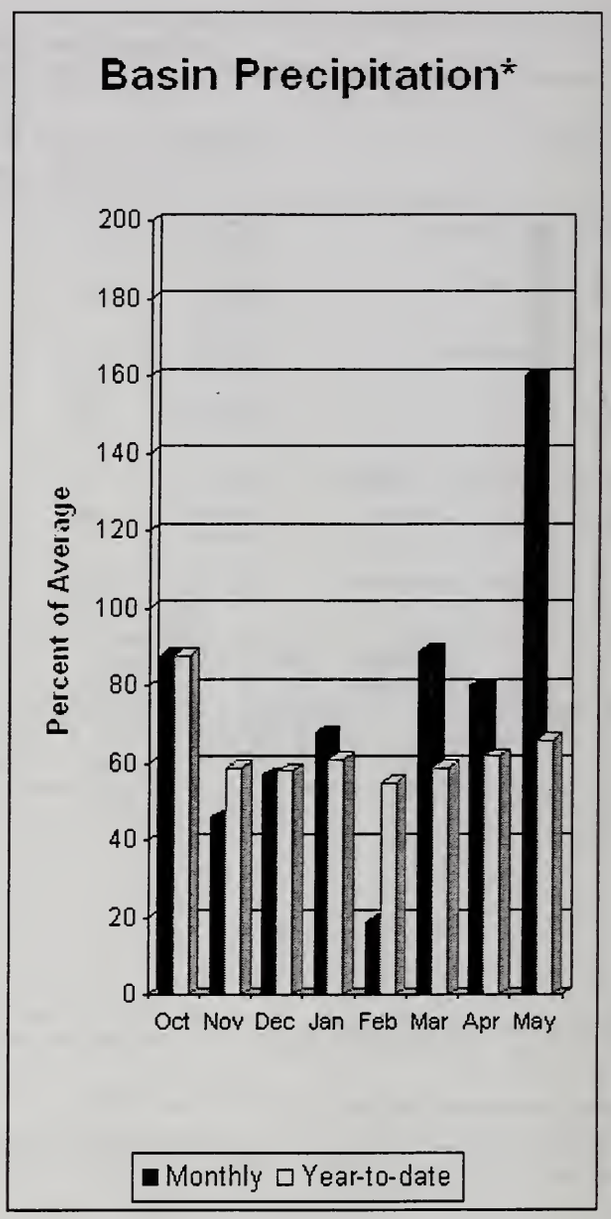
Upper Yakima River Basin





*Based on selected stations

June 1 reservoir storage for the Upper Yakima reservoirs was 632,000-acre feet, 87% of average. Forecasts for the Yakima River at Cle Elum are 32% of average (a new record low) and the Teanaway River near Cle Elum is at 32%. Lake inflows are all forecasted to be near that same range, setting new record low flows, this summer. May streamflows within the basin were Yakima near Cle Elum at 44% and Cle Elum River near Roslyn at 49%. Snowpack had melted at all measuring sites prior to June 1. Precipitation was 160% of average for May and 66% year-to-date for water. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
KEECHELUS LAKE INFLOW	JUN-JUL	7.8	10.1	11.7	25	18.0	27	47
	JUN-SEP	12.2	15.4	17.5	30	25	36	59
KACHESS LAKE INFLOW	JUN-JUL	4.4	5.4	6.1	14	11.0	18.1	43
	JUN-SEP	8.3	10.2	11.5	23	17.1	25	51
CLE ELUM LAKE INFLOW	JUN-JUL	39	46	50	26	67	91	192
	JUN-SEP	59	68	75	33	95	124	230
YAKIMA at Cle Elum	JUN-JUL	68	81	90	27	125	174	340
	JUN-SEP	103	122	135	32	177	232	420
TEANAWAY near Cle Elum	JUN-JUL	4.6	7.1	8.8	24	15.8	26	37
	JUN-SEP	7.2	10.4	12.6	32	19.4	29	40

UPPER YAKIMA RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
KEECHELUS	157.8	97.9	---	140.5
KACHESS	239.0	165.3	---	207.6
CLE ELUM	436.9	368.8	---	379.3

UPPER YAKIMA RIVER BASIN
Watershed Snowpack Analysis - June 1, 2005

Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
UPPER YAKIMA RIVER	6	0	0

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

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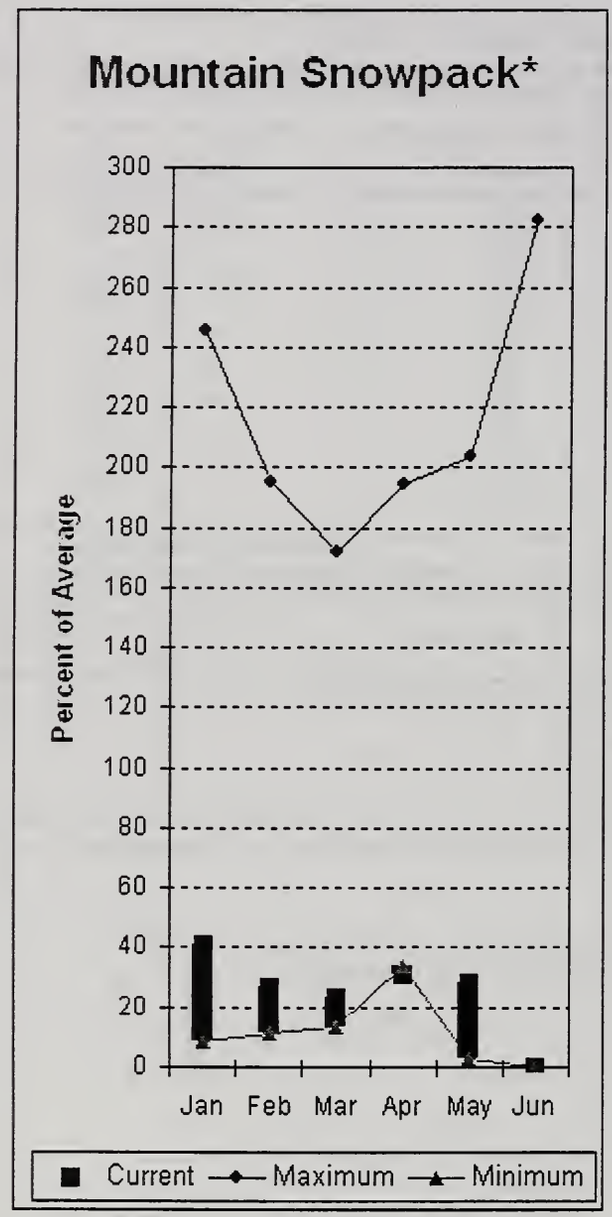
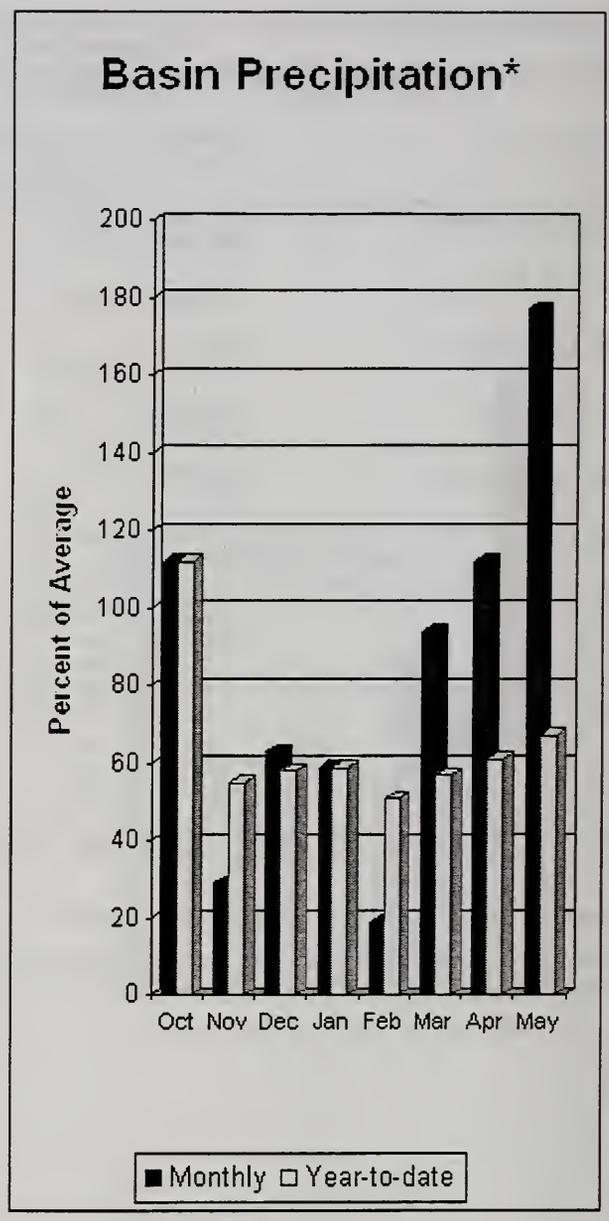
Lower Yakima River Basin





*Based on selected stations

May average streamflows within the basin were: Yakima River near Parker, 42%; Naches River near Naches, 51%; and Yakima River at Kiona, 39%. June 1 reservoir storage for Bumping and Rimrock reservoirs was 231,000-acre feet, 113% of average. Forecast averages for Yakima River near Parker are 25%; American River near Nile, 30%; Ahtanum Creek, 31%; and Klickitat River near Glenwood, 67%. American River, Rimrock, the Naches and the Yakima are all expected to set record low natural flows this summer. Snowpack was completely melted prior to June 1. Precipitation was 177% of average for May and 67% year-to-date for water. Temperatures were 3 degrees above normal for May and 2 degrees above average for the water year. Volume forecasts for Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
BUMPING LAKE INFLOW	JUN-SEP	14.6	18.4	21	29	30	43	72
	JUN-JUL	10.9	14.1	16.3	27	24	36	61
AMERICAN RIVER near Nile	JUN-SEP	15.0	17.2	18.7	30	24	31	63
	JUN-JUL	11.5	13.3	14.6	27	19.2	26	54
RIMROCK LAKE INFLOW	JUN-SEP	37	42	45	31	55	69	144
	JUN-JUL	23	26	28	27	36	47	105
NACHES near Naches	JUN-SEP	99	117	130	32	169	227	410
	JUN-JUL	70	83	92	28	124	171	330
AHTANUM CREEK at Union Gap	JUN-SEP	2.6	3.4	3.9	31	5.7	8.2	12.8
	JUN-JUL	1.7	2.2	2.6	24	4.1	6.3	10.8
YAKIMA near Parker	JUN-SEP	166	201	225	25	320	460	900
	JUN-JUL	110	134	150	21	227	342	715
KLICKITAT near Glenwood	JUN-JUN	11.6	17.8	22	50	26	32	44
	JUN-SEP	19.4	29	36	46	42	52	78

LOWER YAKIMA RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
BUMPING LAKE	33.7	33.6	---	30.4
RIMROCK	198.0	197.7	---	173.5

LOWER YAKIMA RIVER BASIN
Watershed Snowpack Analysis - June 1, 2005

Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
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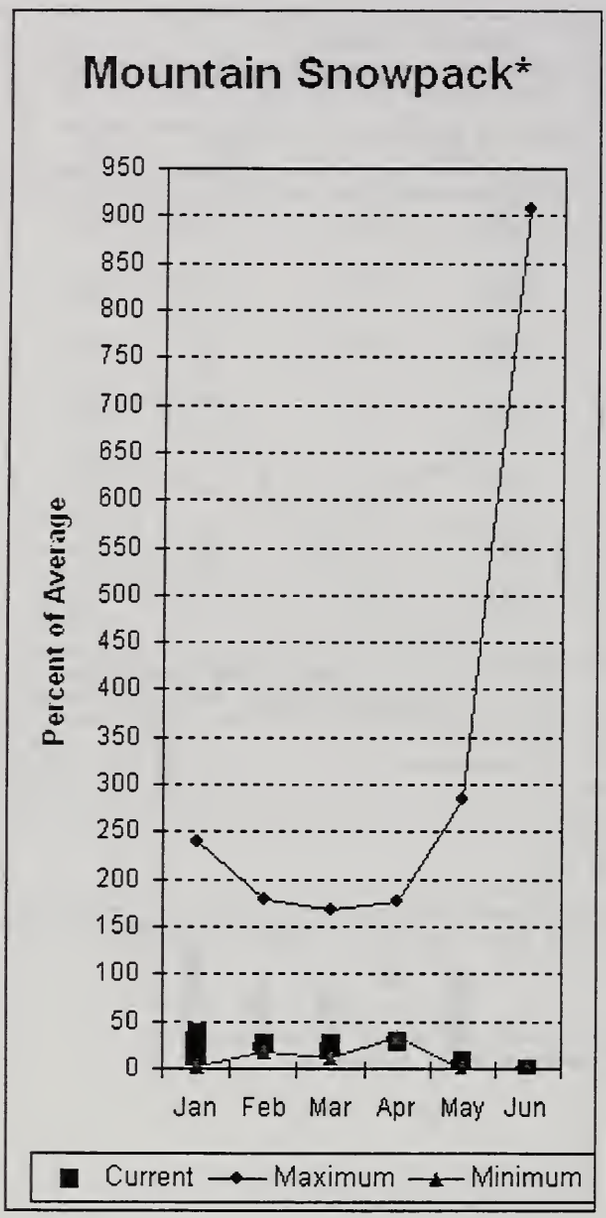
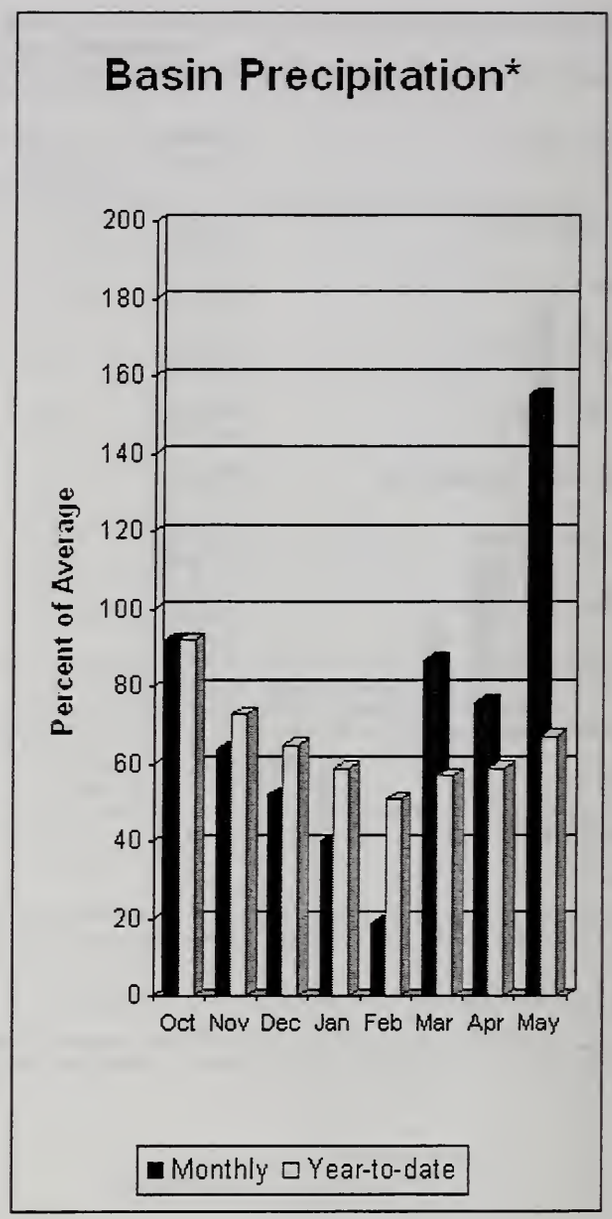
Walla Walla River Basin





*Based on selected stations

May precipitation was 155% of average, maintaining the year-to-date precipitation at 67% of average. Snowpack in the basin was melted prior to the first of the month. Streamflow forecasts are 41% of average for Mill Creek and 73% for the SF Walla Walla near Milton-Freewater. May streamflow was 65% of average for the Walla Walla River. Average temperatures were 2 degrees above normal for May and 2 degrees above average for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<======= Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
MILL CREEK at Walla Walla	MAY-SEP	2.4	3.2	3.7	41	5.0	6.9	9.0
	MAY-JUL	2.2	2.9	3.4	38	4.7	6.6	8.9
SF WALLA WALLA near Milton-Freewater	JUN-JUL	9.0	10.7	11.9	62	13.8	16.6	19.2
	JUN-SEP	19.1	22	24	73	27	30	33

WALLA WALLA RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

WALLA WALLA RIVER BASIN
Watershed Snowpack Analysis - June 1, 2005

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
WALLA WALLA RIVER	2	0	0

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

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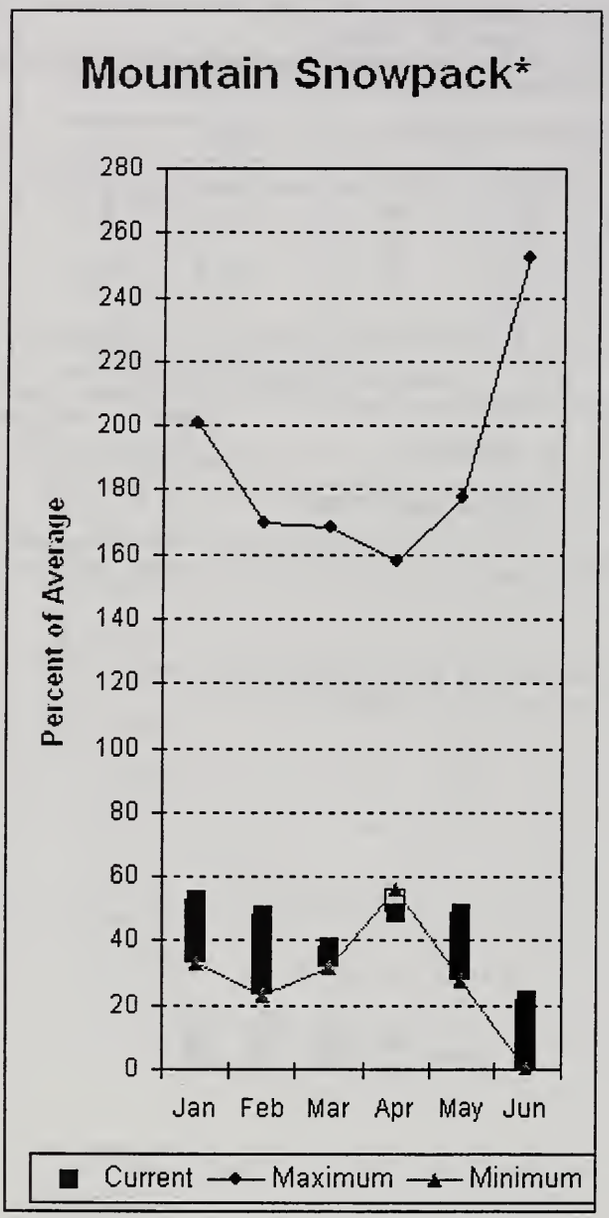
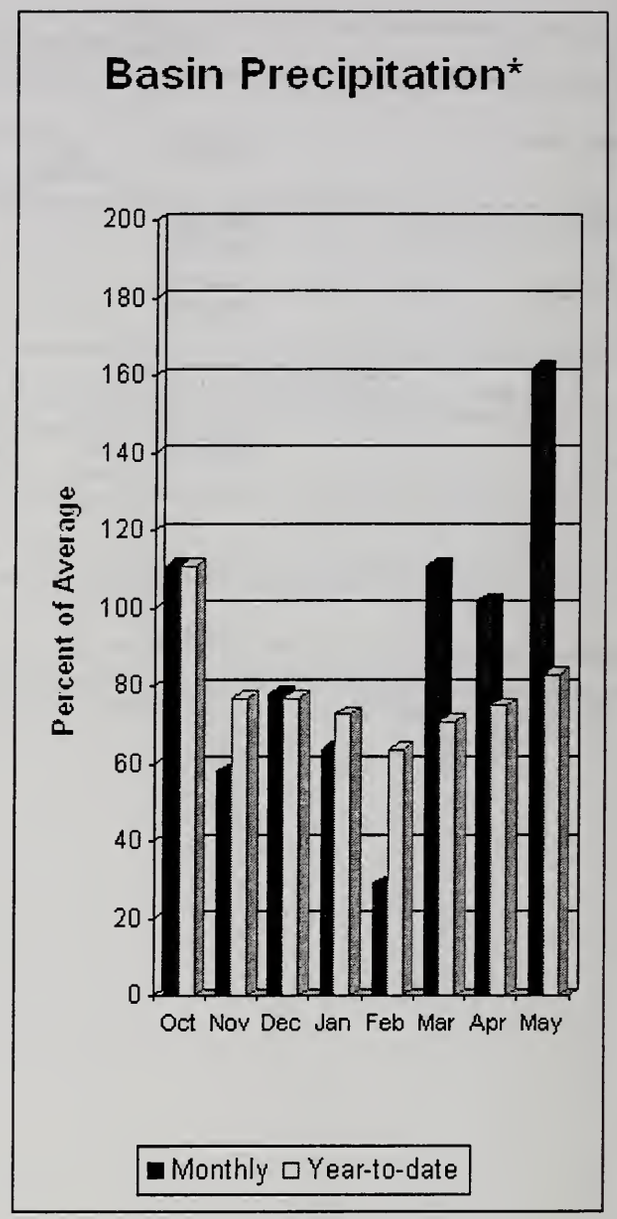
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Lower Snake River Basin





*Based on selected stations

The June - September forecast is for 45% for Clearwater River at Spalding. The Snake and Grande Ronde rivers can expect summer flows to be about 65% and 59% of normal respectively. May precipitation was 162% of average, bringing the year-to-date precipitation to 83% of average. June 1 snowpack readings averaged 22% of normal. May streamflow was 77% of average for Snake River below Lower Granite Dam and 92% for Grande Ronde River near Troy. Average temperatures were 2 degrees above normal for May and 2 degrees above normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
GRANDE RONDE at Troy (1)	JUN-JUL	129	219	260	55	301	390	470
	JUN-SEP	178	286	335	59	384	492	565
CLEARWATER at Spalding (1,2)	JUN-JUL	1047	1317	1500	51	1860	2650	2960
	JUN-SEP	1311	1620	1830	54	2220	3070	3370
SNAKE blw Lower Granite Dam (1,2)	JUN-JUL	4533	5645	6150	66	6655	7770	9340
	JUN-SEP	5757	7169	7810	66	8450	9860	11900

LOWER SNAKE RIVER BASIN
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

LOWER SNAKE RIVER BASIN
Watershed Snowpack Analysis - June 1, 2005

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
LOWER SNAKE, GRANDE RONDE	9	30	22

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

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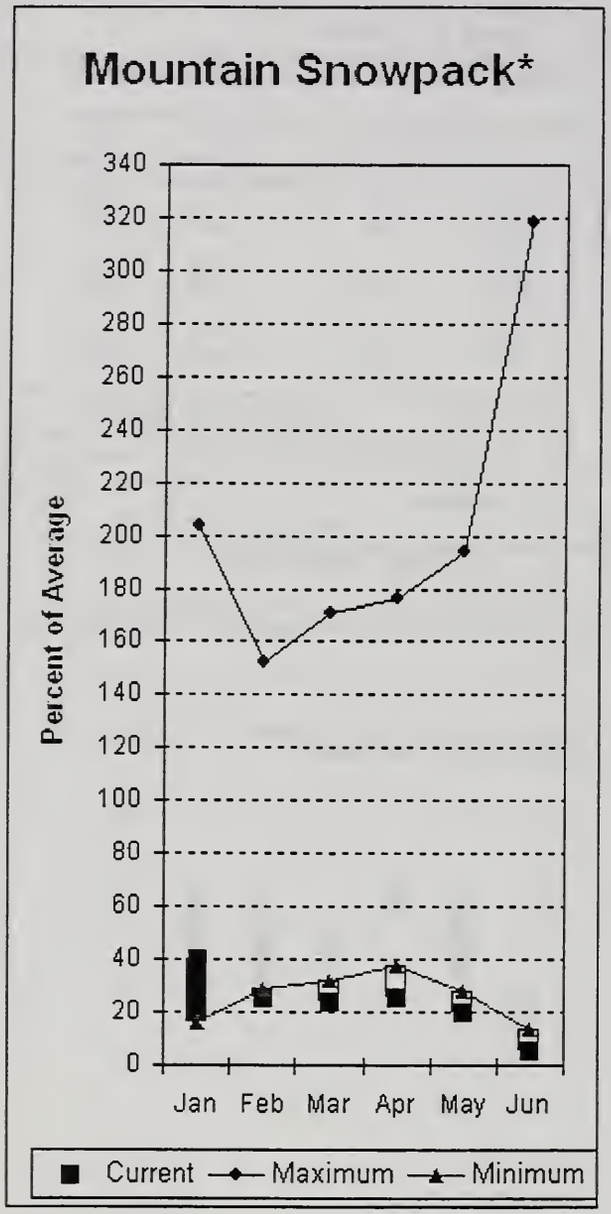
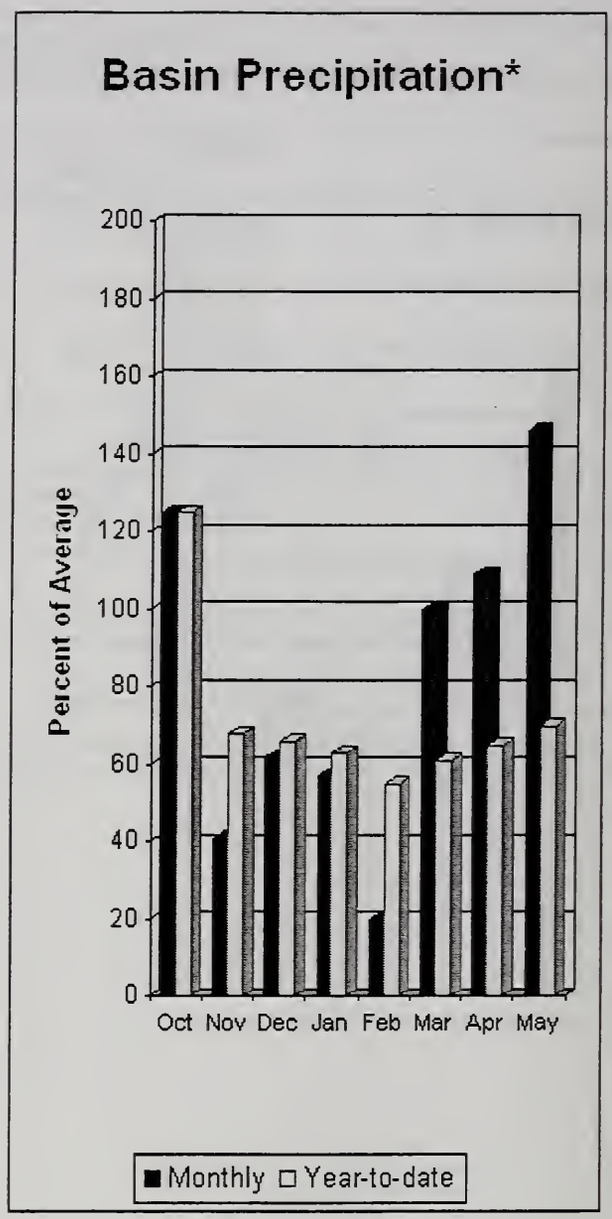
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Cowlitz - Lewis River Basins





*Based on selected stations

Forecasts for June – September streamflows within the basin are Lewis River at Ariel, 62% and Cowlitz River at Castle Rock, 77% of average. The Columbia at The Dalles is forecasted to have 68% of average flows this summer. May average streamflow for Cowlitz River was 79% and 82% for Lewis River. The Columbia River at The Dalles was 81% of average. May precipitation was 146% of average and the water-year average was 70%. June 1 snow cover for Cowlitz River was 6%, and Lewis River snow was all melted. Average temperatures were 3 degrees above normal during May and 2 degrees above normal throughout the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<======= Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
LEWIS at Ariel (2)	JUN-JUL	139	181	210	62	239	279	338
	JUN-SEP	214	265	300	62	335	385	483
COWLITZ R. bl Mayfield Dam (2)	JUN-SEP	84	364	680	73	995	1460	938
COWLITZ R. at Castle Rock (2)	JUN-SEP	63	562	965	77	1370	1960	1259
KLICKITAT near Glenwood	JUN-JUN	11.6	17.8	22	50	26	32	44
	JUN-SEP	19.4	29	36	46	42	52	78
COLUMBIA R. at The Dalles (2)	JUN-SEP	27845	34666	39300	68	43930	50750	57800
	JUN-JUL	19344	25034	28900	66	32770	38460	43800

COWLITZ - LEWIS RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

COWLITZ - LEWIS RIVER BASINS
Watershed Snowpack Analysis - June 1, 2005

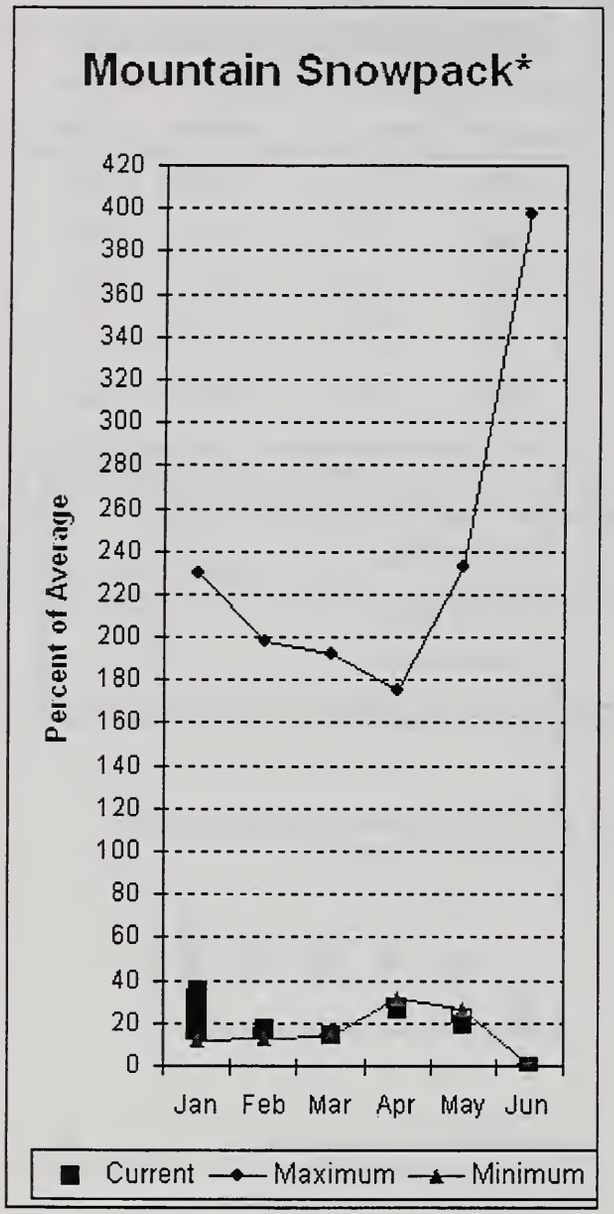
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
LEWIS RIVER	3	0	0
COWLITZ RIVER	5	8	6

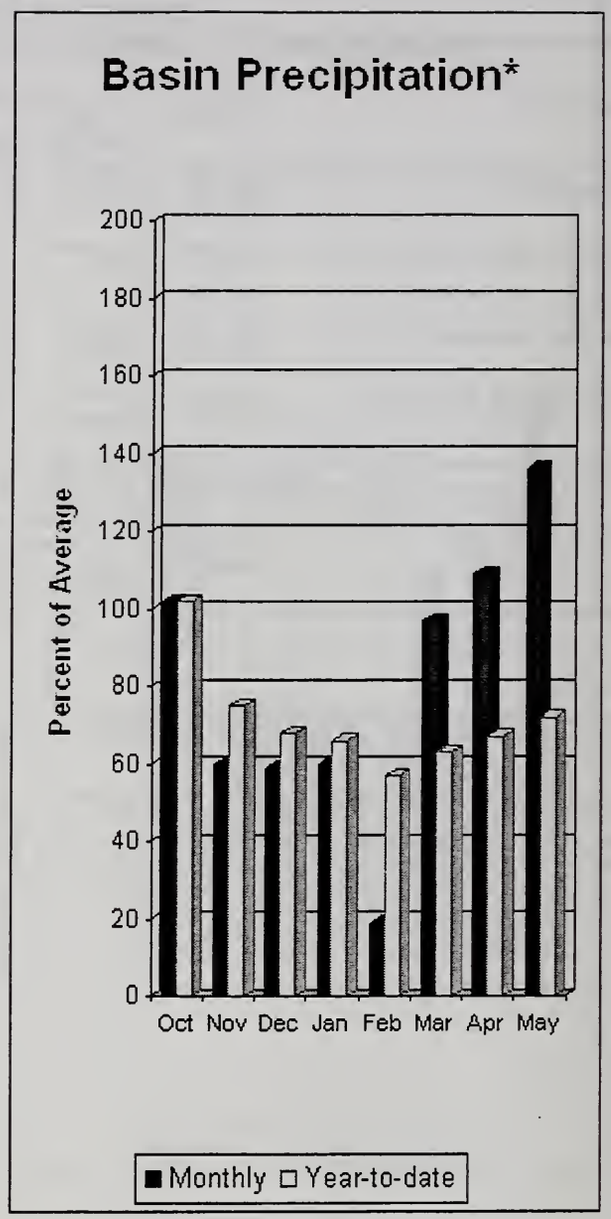
* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

White - Green River Basins





*Based on selected stations

Summer runoff is forecast to be 58% of normal for the Green River below Howard Hanson Dam and 69% for the White River near Buckley. Snowpack was completely melted at all sites in all three basins by June 1. Corral Pass SNOTEL, at an elevation of 6,000 feet, would normally still have about 23 inches of water and wouldn't melt until sometime in July. May precipitation was 136% of average, bringing the water year-to-date to 72% of average for the basins. Average temperatures in the area were 3-4 degrees above normal for May and 2 degrees above normal for the water-year.

For more information contact your local Natural Resources Conservation Service office.

White - Green - Puyallup River Basins

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<======= Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
WHITE near Buckley (1,2)	JUN-JUL	94	128	143	65	158	192	220
	JUN-SEP	152	195	215	69	235	280	313
GREEN below Howard Hanson (1,2)	JUN-JUL	7.4	27	36	49	45	65	73
	JUN-SEP	24	47	57	58	67	90	99

WHITE - GREEN - PUYALLUP RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

WHITE - GREEN - PUYALLUP RIVER BASINS
Watershed Snowpack Analysis - June 1, 2005

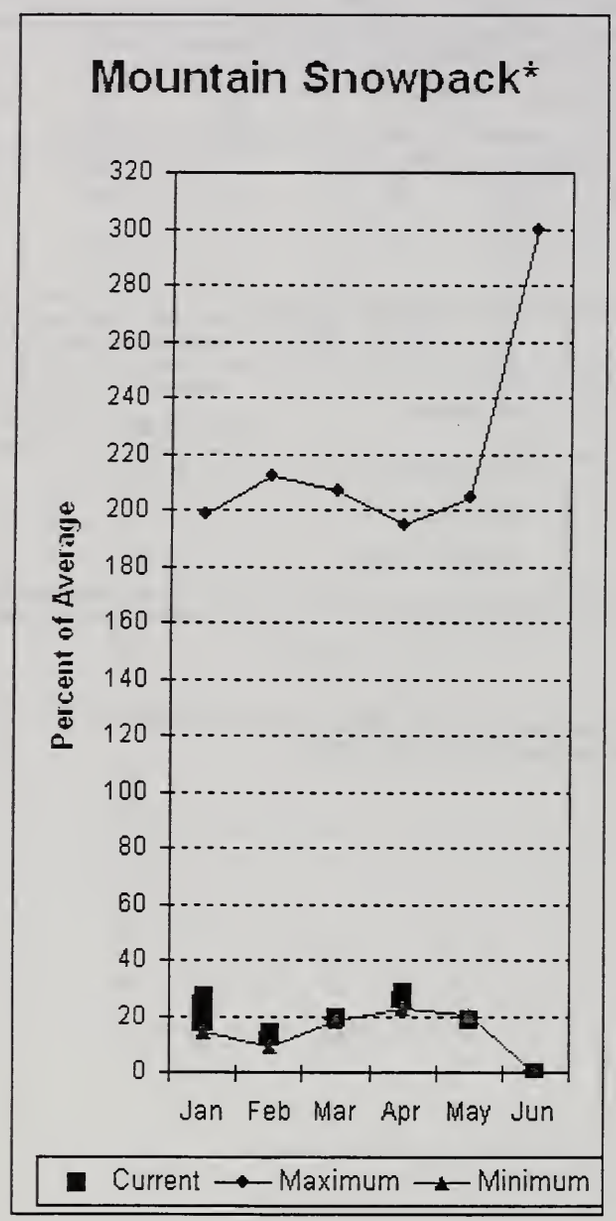
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
WHITE RIVER	2	0	0
GREEN RIVER	2	0	0
PUYALLUP RIVER	2	0	0

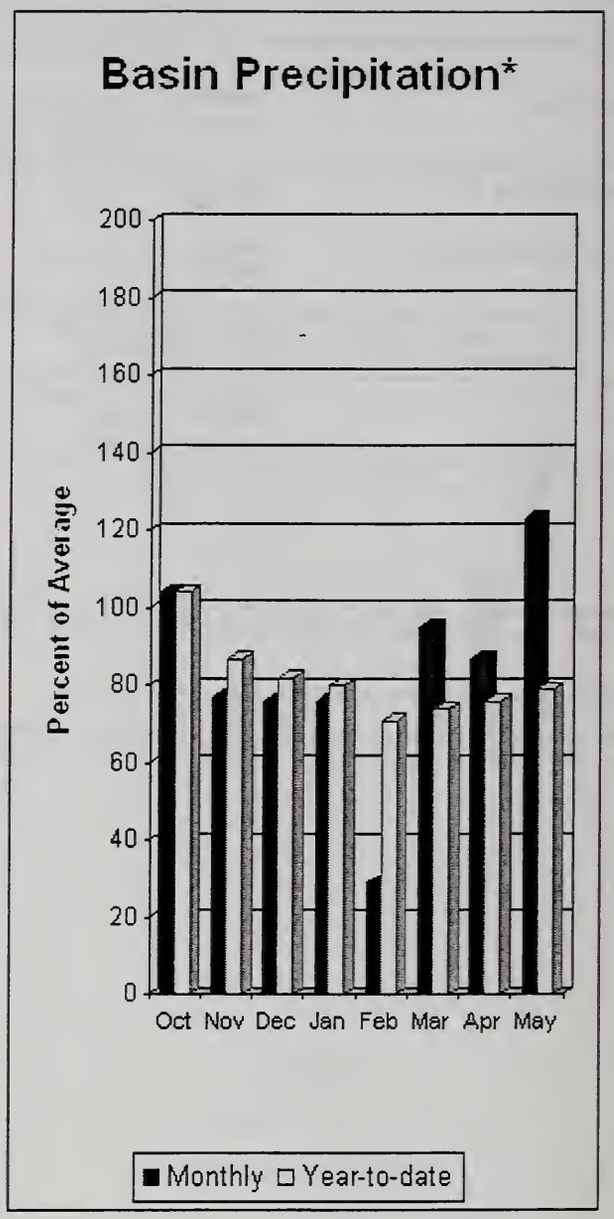
* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.

Central Puget Sound River Basins





*Based on selected stations

Forecast for spring and summer flows are: 56% for Cedar River near Cedar Falls; 53% for Rex River; 54% for South Fork of the Tolt River; and 59% for Cedar River at Cedar Falls. Basin-wide precipitation for May was 123% of average, bringing water-year-to-date to 79% of average. Snow cover within all watersheds in the basin had melted prior to June 1. Temperatures were 3-4 degrees above average for May and 2 degrees above normal for the water-year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
CEDAR near Cedar Falls	JUN-JUL	5.2	11.6	16.0	59	20	26	27
	JUN-SEP	5.8	13.6	19.0	56	25	33	34
REX near Cedar Falls	JUN-JUL	0.2	2.1	4.1	50	6.1	9.0	8.2
	JUN-SEP	0.1	3.3	5.7	53	8.1	11.7	10.8
CEDAR RIVER at Cedar Falls	JUN-JUL	2.1	6.8	10.0	55	13.0	18.0	18.2
	JUN-SEP	5.4	8.3	10.3	59	12.3	15.6	17.5
SOUTH FORK TOLT near Index	JUN-JUL	1.8	2.8	3.5	57	4.2	5.2	6.1
	JUN-SEP	2.7	3.8	4.5	54	5.2	6.3	8.3

CENTRAL PUGET SOUND RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

CENTRAL PUGET SOUND RIVER BASINS
Watershed Snowpack Analysis - June 1, 2005

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
CEDAR RIVER	4	0	0
TOLT RIVER	2	0	0
SNOQUALMIE RIVER	4	0	0
SKYKOMISH RIVER	2	0	0

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

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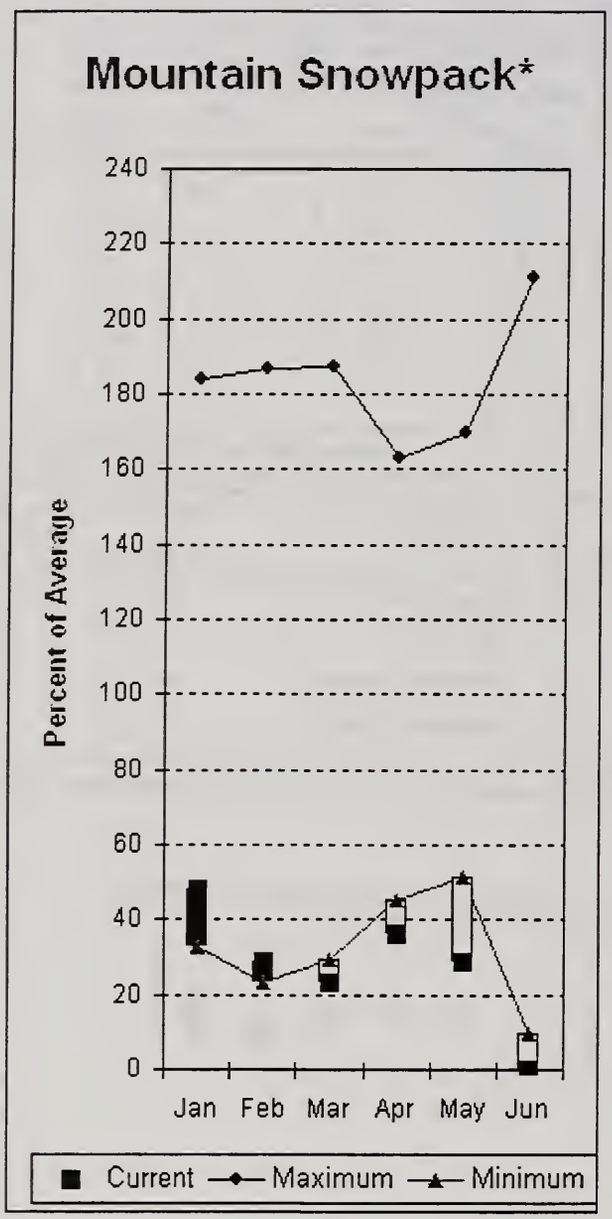
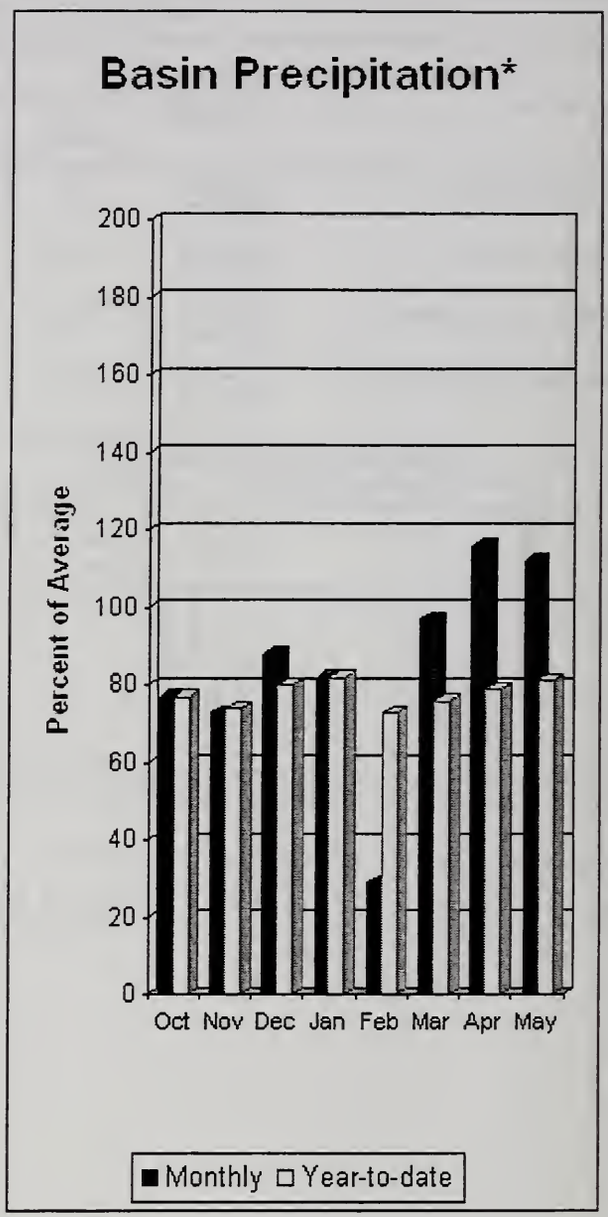
North Puget Sound River Basins





*Based on selected stations

Forecast for Skagit River streamflow at Newhalem is 52% of average for the spring and summer period. May streamflow in Skagit River was 66% of average. Other forecast points included the Baker River at 67% (a new record low) and Thunder Creek at 70% of average (second lowest on record). Basin-wide precipitation for May was 112% of average, bringing water-year-to-date to 81% of average. Snowpack reports from SNOTEL had shown melt out, in both the Skagit and Nooksack rivers, prior to June 1. Attempts to conduct manual snow surveys at higher elevations had not been successful due to weather conditions. It is estimated that there is some snow left above 5000 feet but without verification it's difficult to say how much. June 1 Skagit River reservoir storage was 124% of average and 93% of capacity. Average temperatures for May were 3 degrees above normal for the basin and 2 degree above average for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
THUNDER CREEK near Newhalem	JUN-JUL	87	100	109	69	118	131	158
	JUN-SEP	151	168	180	70	192	207	257
SKAGIT at Newhalem (2)	JUN-JUL	360	455	520	49	585	680	1054
	JUN-SEP	550	655	725	52	795	900	1407
BAKER RIVER near Concrete	JUN-JUL	263	291	310	67	329	357	465
	JUN-SEP	435	450	460	67	470	485	687

NORTH PUGET SOUND RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
ROSS	1404.1	1306.1	---	1031.4
DIABLO RESERVOIR	90.6	83.5	---	86.9

NORTH PUGET SOUND RIVER BASINS
Watershed Snowpack Analysis - June 1, 2005

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
SKAGIT RIVER	3	0	0
BAKER RIVER	0	0	0
NOOKSACK RIVER	1	0	0

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

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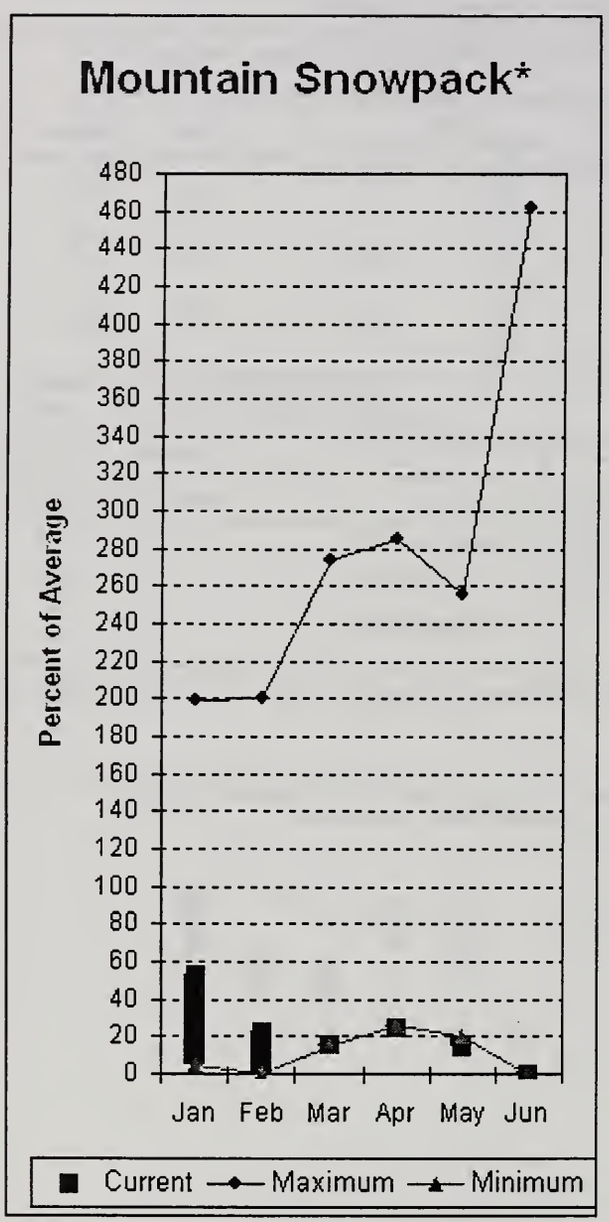
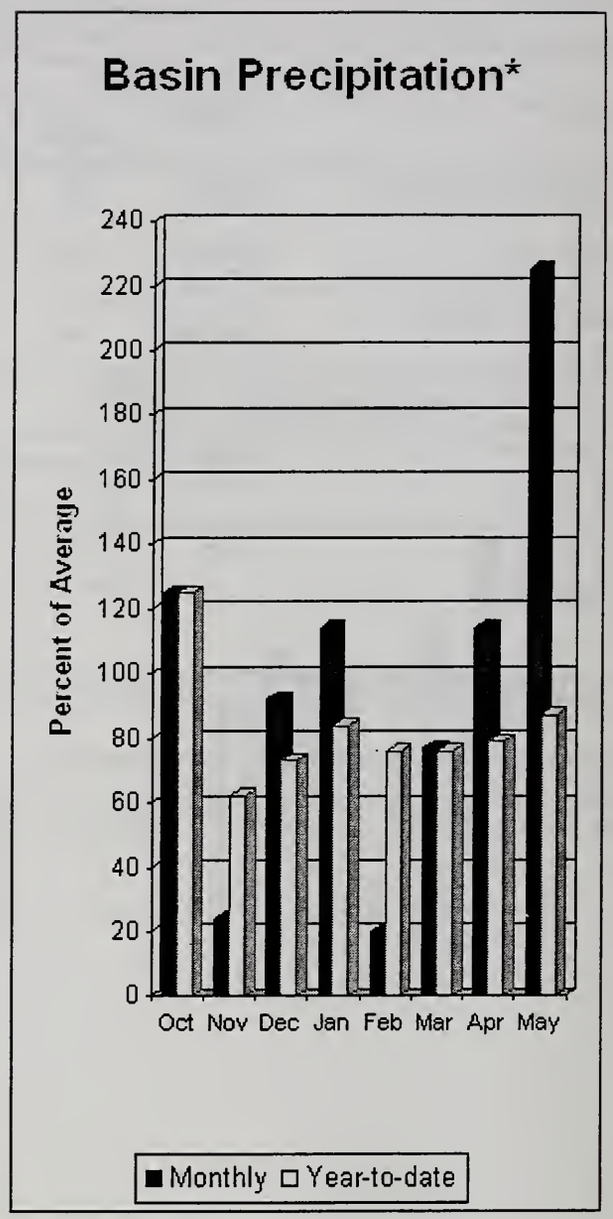
Olympic Peninsula River Basins





*Based on selected stations

Forecasted average runoff for streamflow in the Dungeness River and Elwha River basins is 60% and 49%, respectively, which are record or near record low flows for both rivers. Big Quilcene and Wynoochee rivers should expect below average runoff this summer as well. May precipitation was 225% of average. Precipitation has accumulated at 87% of average for the water year. May precipitation at Quillayute was 5.87 inches. The thirty-year average for May is 5.51 inches. Olympic Peninsula snowpack had melted prior to June 1. Temperatures were 4 degrees above average for May and 1-2 degrees above average for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - June 1, 2005

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
DUNGENESS near Sequim	JUN-SEP	47	54	59	60	64	71	99
	JUN-JUL	30	35	38	54	41	46	71
ELWHA near Port Angeles	JUN-SEP	115	136	150	49	164	185	306
	JUN-JUL	78	94	105	47	116	132	222

OLYMPIC PENINSULA RIVER BASINS
Reservoir Storage (1000 AF) - End of May

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

OLYMPIC PENINSULA RIVER BASINS
Watershed Snowpack Analysis - June 1, 2005

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
OLYMPIC PENINSULA	1	0	0

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

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(2) - The value is natural volume - actual volume may be affected by upstream water management.

GLACIER PAGE 2005

North Cascades National Park Glacier Monitoring Program

The National Park Service began monitoring glaciers in North Cascades National Park in 1993 and Mount Rainier glaciers in 2002 (see the Mount Rainier Glacier Page). Goals for this program and additional data can be found at North Cascades National Park home page at http:/www.nps.gov/noca/massbalance.htm or contact Jon_Riedel@nps.gov or Rob_Burrows@nps.gov.

The four glaciers monitored are located at the headwaters of four watersheds, each with large hydroelectric operations (Figure 1). The glaciers represent a range in elevation from 8800 to 5600 feet, and a range in climatic conditions from maritime to continental. Methods include three visits annually to each glacier to measure winter accumulation and summer melt. Measurements are taken at a series of points down the centerline of each glacier (Table 1), and then integrated across the entire glacier surface to determine mass balance for the entire glacier. Figure 2 shows that 2004 was a negative net balance year adding to the strongly negative trend of the last 5 years. A summary report of the mass balance data is in progress.

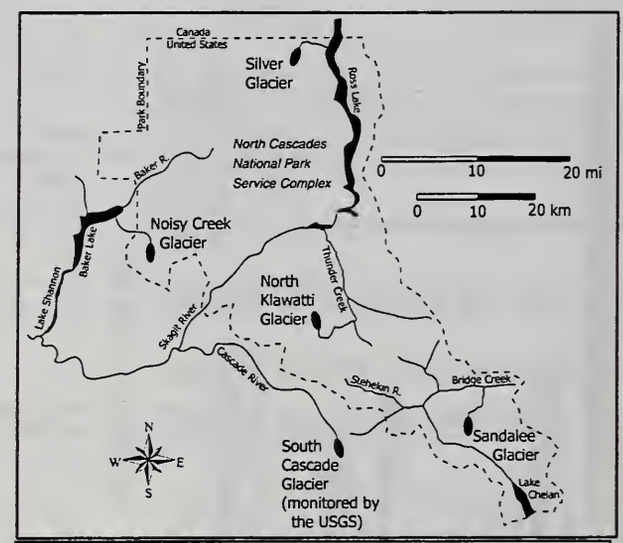


Figure 1. Glaciers monitored in North Cascades N.P.S. Complex.

Table 1. Glacier:	'Elevation (feet)	Average Accumulation (inches W.E.)	2005 Accumulation (inches W.E.)	2005 Percent of Average
Noisy Creek Density= 0.43 @ 5900 ft 4/21/05	**Entire Glacier**	**120**	**75**	**63**
	6060	127	86	68
	6050	129	86	66
	5900	116	66	57
	5790	111	62	56
	5640	111	72	65
Silver Density= 0.46 @ 7130 ft 4/21/05	**Entire Glacier**	**91**	**52**	**57**
	8410	113	70	61
	7870	97	37	38
	7540	114	59	52
	7130	62	44	72
N. Klawatti Density= 0.36 @6890' 4/21/05	**Entire Glacier**	**114**	**63**	**55**
	7650	118	69	58
	7270	120	68	57
	6890	120	70	58
	6420	103	61	60
	6120	93	38	41
Sandalee Density= 0.43 7350' 4/20/05	**Entire Glacier**	**117**	**78**	**67**
	7350	110	68	62
	7110	120	80	69
	6860	111	82	74
	6530	127	94	74

Table 1 presents this spring's provisional winter accumulation data, along with average values and percent of the 13-year average. The 2005 snow depths were measured between April 20 and 21 on the four glaciers. Ice layers and cold temperatures within the snowpack made probing difficult on the upper Silver Glacier. These data are tentative and will be revised after a July visit. Snow densities at Noisy, Silver, and Sandalee glaciers are averages of samples from the wall of snow pits. The density at the mid-elevation of North Klawatti Glacier is bulk density from a snow core sample. Densities are in fraction of water density.

Estimates of glacial contribution to runoff for four watersheds are based on the mass balance measurements and GIS analyses to determine glacier area within 165 ft (50-meter) elevation bands (Table 2). Glaciers reduce the variation of flow in these watersheds by providing melt water from firn and ice during summer drought in dry/warm years and by storing water in excess snowpack during wet/cool years. Glacial contribution to stream flow in these watersheds varies by as much as 100% annually. Magnitude of glacial contribution to streamflow is large, but varies by the amount of glacial cover in each watershed. Thunder Creek is 13% glacierized; Baker River, 3%; Stehekin River, 6%; and Ross Lake, 0.9% (Post and others, 1971; Granshaw, 2002).

The glacierized area of a watershed primarily dictates the glacier contribution on runoff. However, the relative importance of glacial contribution to streamflow also generally increases from west to east. For example, glaciers annually contribute a higher percentage of meltwater to streamflow in the Stehekin watershed than in the Baker, despite the fact that the Baker is more highly glacierized. This is due to lower snowfall east of the hydrologic crest of the North Cascades. In this below average accumulation year, similar to 2004, we anticipate that glacier contribution to summer runoff will be above average, particularly because of the very low snowpack at elevations below the glaciers.

	May-September Runoff (thousands acre-feet)				Percent Glacial Runoff to Total Summer Runoff		
	Mean	2004	minimum	maximum	2004	minimum	maximum
Noisy Creek Glacier	1.5	1.7	1.1	1.9			
Baker River Watershed	**69**	**78**	**50**	**87**	**10**	**6**	**15**
North Klawatti Glacier	4.0	4.2	2.8	4.8			
Thunder Creek Watershed	**95**	**105**	**72**	**119**	**34**	**21**	**40**
Sandalee Glacier	0.5	0.5	0.4	0.6			
Stehekin River Watershed	**70**	**78**	**52**	**88**	**13**	**5**	**15**
Silver Glacier	1.0	1.0	0.7	1.2			
Ross Lake Watershed	**64**	**71**	**47**	**81**	**N/A**	**N/A**	**N/A**

Table 2. Glacial contribution to summer stream flow (May 1 to Sept. 30) for four watersheds. Runoff units are thousands of acre-feet. Data from 1993-2004 except the Sandalee Glacier and Stehekin River Watershed (1995-2004).

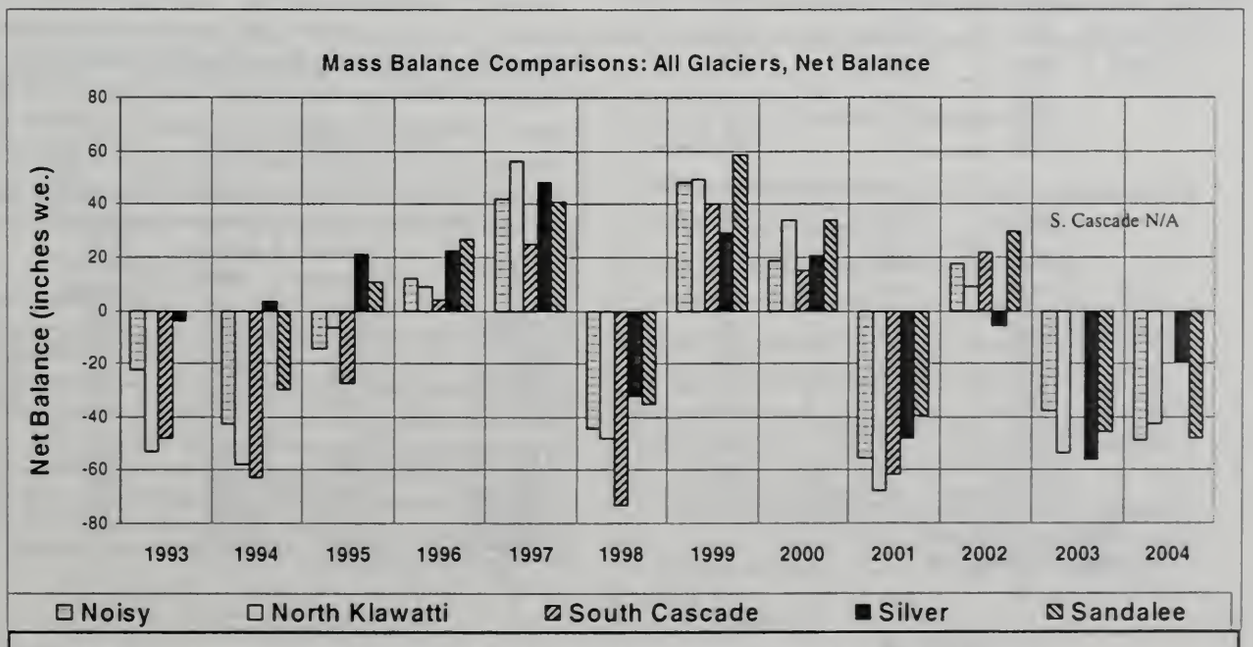


Figure 2. Net annual mass balance for the five glaciers monitored in the North Cascades

MOUNT RAINIER GLACIER PAGE 2005

This year the National Park Service continues to monitor mass balance on Mount Rainier glaciers. The program includes field measurements of snow depth and density and snow and ice melt on Nisqually and Emmons Glaciers; annual photography; and 10-year remapping of the glaciers below 10,000 feet. This program is a cooperative venture between Mount Rainier National Park and North Cascades National Park.

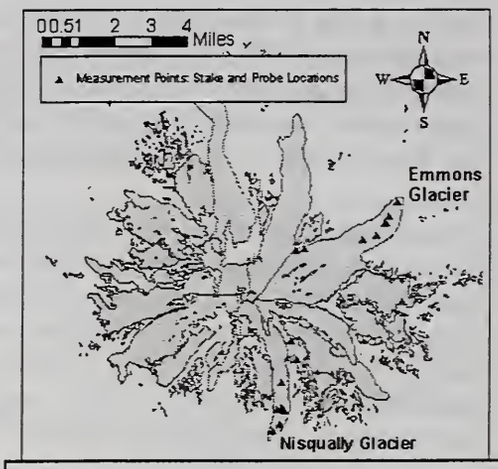


Figure 1. Glacier cover of Mount Rainier, monitored glaciers, and measurement locations on Muir Snowfield, Emmons, and Nisqually Glaciers

Between April 7 and May 10 we measured bulk density of the snowpack, probed snow depths, and placed ablation stakes on the Nisqually and Emmons glaciers below 10,000 feet. Accumulation on the south side of the mountain (Muir Snowfield and Nisqually Glacier) shows an increasing trend with elevation to ~7150 feet and decreasing trend above (Table 1). Accumulation on Emmons Glacier generally increases with altitude to the ceiling of our spring measurements at ~9500 feet (Table 1). Nearby SNOTEL sites (Morse Lake, Corral Pass, and Paradise) indicate glacier measurements were taken near the time of maximum snowpack at these sites. Total winter accumulation on the lower glaciers (below ~7000 feet) is very low. Note the relatively low density snow at 6500 feet on Emmons Glacier and 5740 feet on Nisqually indicating relatively recent deposition of much of the snow depth. Snow from mid-March to the time of measurement was important portion of the total this year. Ablation stakes were placed at 7150, 6150, and 5740 feet on Nisqually Glacier, at 9910 and 8640 feet on the Muir Snowfield, and at 9450, 9200, 6500, 5600, and 5160 feet on Emmons Glacier. We will return in mid June to check ablation stakes, re-probe snow depths, and collect snow depth and density data from 10,000 feet to the summit. We expect further snow accumulation until ~mid June on the upper mountain. On a fall visit (late September/early October) we will record final ablation measurements from the stakes below 10,000 feet. For more information contact Jon_Riedel @nps.gov or Rob_Burrows@nps.gov.

Table 1	Elevation	Accumulation (inches w.e.)	
	feet	2004	2005
Emmons Glacier	9450	74	126*
	9200	74	105*
	7300	63	na
	6500	65	27
	5625	48	25
	5590	36	32
	5160	32	9
Muir Snowfield and Nisqually Glacier	9910	89	59
	8640	92	70
	7150	167	79
	6150	98	49
	6150	83	33
	5740	67	13
	5280	74	na
	5120**	72	34

* Possible over estimate due to probe penetration into underlying firn layers.
** Paradise SNOTEL site.

Table 1. Accumulation on Mount Rainier Glaciers, Spring 2004 and 2005. Determined from probing snow depth at 1 to 11 points on each elevation contour. Provisional Data.

Table 2. 2005 spring snow density measured on Mt. Rainier. Although the density was measured a month apart on the upper and lower Emmons Glacier we believe this represents the density at near maximum snow accumulation at each point. Provisional Data.

Glacier	Snow Density	Altitude (feet)	Snow Depth (inches)	Date
Emmons	0.43	9450	292	5/5/05
Inter	0.50	6000	155	5/4/05
Emmons	0.33	6500	72	4/7/05
Emmons	0.43	5625	42	4/7/05
Muir Snowfield	0.35	9920	163	4/27/05
Nisqually	0.47	7150	157	4/28/05
Nisqually	0.35	5740	28	4/28/05
Paradise SNOTEL	0.56	5120	61	4/30/05

Mount Rainier Glacier Monitoring 2004 Summary

The 2004 Water Year of glacier monitoring on Mount Rainier was extremely productive and provided interesting results and new insights about Emmons and Nisqually Glaciers. Seven visits each were made to the glaciers between March 30 and October 1 to assess the accumulation (winter balance, b_w) and ablation of snow, firn and ice (summer balance, b_s) at selected points. Winter balance was measured on lower Emmons Glacier on March 30 and near Camp Schurman, mid glacier, on May 2. Winter balance was measured both on the lower Nisqually and Muir Snowfield on April 8. We believe the maximum bw on the mid to upper Nisqually and Muir Snowfield occurs earlier than the same altitude range on the Emmons Glacier because of the south facing aspect of Nisqually. However, this date was likely a bit earlier than the maximum because the Paradise SNOTEL registered maximum SWE on April 27. Snow depth was measured above 10,000 feet on the upper Emmons Glacier on June 16 along with snow density in the summit crater and at 9500 feet near Camp Schurman.

Summer balance data (b_s) versus altitude are fitted piecewise with a cubic polynomial and exponential function and is extrapolated to the upper mountain. Surface ablation losses based on this function are added to the average snow depth from June 16 at each location to find estimates for total winter snow depth. Winter balance (b_w) is the product of snow density (linear relationship with altitude) and total winter snow depth. Winter balance vs. altitude are also piecewise fits for both Emmons and Nisqually Glaciers (Figures 2 and 3). Because of the difficult access to upper Nisqually glacier no data were collected above 10,000 feet on the glacier proper however data collected on the upper Ingraham and Emmons glaciers are assumed to be representative of upper Nisqually.

Summer balance magnitude and melt rates on lower Emmons and Nisqually Glaciers were measured in two distinct zones; bare ice and debris covered ice (Figure 2 &3). The debris is thick enough that it has a significant insulating effect thus reducing ablation by 10-40% compared to bare ice at the same altitude. At steep ice faces within the debris covered zone, the debris forms a thin veneer and melting is enhanced

The end result of these seasonal measurements is the net balance, b_n, which is the sum of b_w and b_s. Table 3 shows glacier-wide b_w, b_s, and b_n for both glaciers. These values are the result of integrating the altitude-balance functions (or fits) discussed above with 10 meter altitude bands on each glacier. The 2004 Water Year was less negative for glaciers at Mt. Rainier than those in the North Cascades. At Mount Rainier, Emmons Glacier lost an average of 7500 acre-feet of water across the surface and Nisqually lost an average of 5700 acre-feet. All data presented here are provisional.

Glacier	Balance (inches w.e.)		error	Measurement Date
Emmons	b_w=	59	8	March 30 and May 2
	b_s=	-91	26	October 1
	b_n=	-31	28	----
Nisqually	b_w=	85	15	April 8
	b_s=	-126	34	October 1
	b_n=	-41	31	----

Table 3. Provisional glacier-wide balances for Water Year 2004

Figure 2

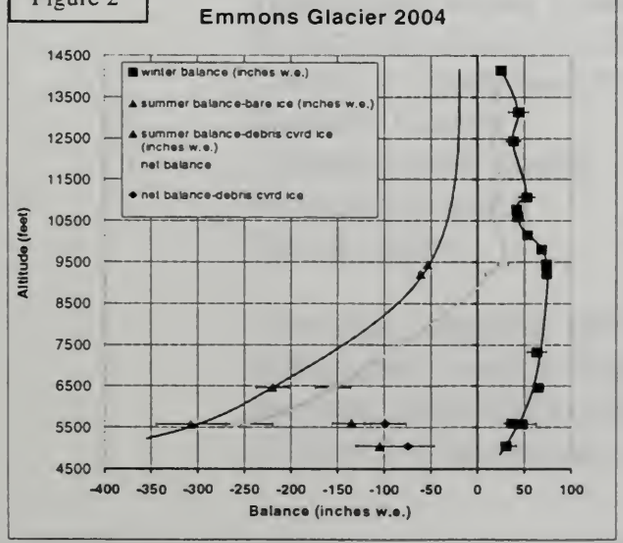
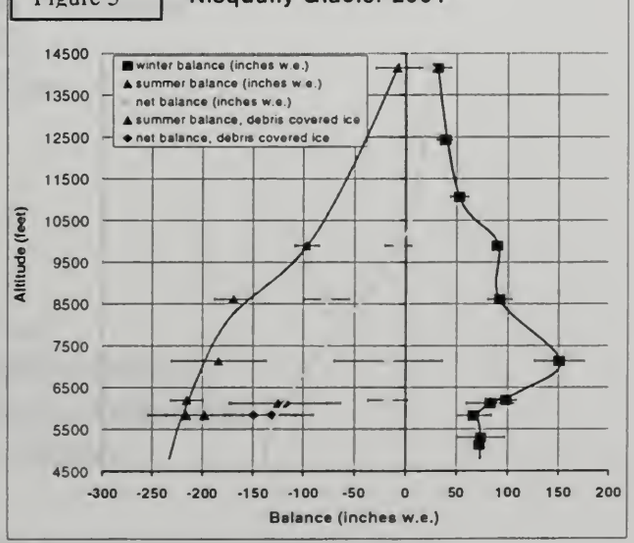


Figure 3



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The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada
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Snow Survey, River Forecast Centre, Victoria, British Columbia

State
Washington State Department of Ecology
Washington State Department of Natural Resources

Federal
Department of the Army
- Corps of Engineers

U.S. Department of Agriculture
- Forest Service

U.S. Department of Commerce
- NOAA, National Weather Service

U.S. Department of Interior
- Bonneville Power Administration
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Private
Okanogan Irrigation District
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Newman Lake Homeowners Association
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*Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.

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Washington Water Supply Outlook Report

Natural Resources Conservation Service
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